

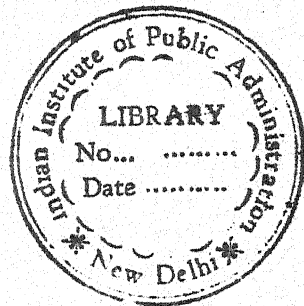
URBAN PROBLEMS

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H.U. BIJLANI



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Foreword

Professor H.U. Bijlani is no stranger to the City of Delhi and certainly not to me. I have known him for the last twenty years when he came to the Municipal Corporation of Delhi as a young engineer. Since then we have all seen the unfolding of his personality in a number of ways. His role in the planned development of Delhi in the widening of its roads and avenues, in the improvement of slums and uncontrolled settlements and other infrastructure facilities has been prodigious. One predominant feature of Prof. Bijlani's style and method of work and his personality is the human approach to problems of urban development. He is never out of touch with realities. He has never concerned himself with imposing upon the city a pattern of development which is arbitrary and dissociated from the realities of human existence and which in the process of implementation, turns out to be a cold, impersonal and cruel exercise conceived in any ivory tower. Both in design and executive, Prof. Bijlani's imaginative mind is never divorced from the warmth of human feeling and from a tremendous concern and consideration for the convenience, comfort and welfare of the millions of people who inhabit the city. This above all has endeared Prof. Bijlani to me beyond words.

I have glanced through the pages of Prof. Bijlani's manuscript and can say without hesitation that his book comes out as a brilliant human document on various urban problems. He is one of those rare engineers whose style is lively, intelligible and vivacious. It is most refreshing to find him quote poetry more often than learned treatises and authors. The most intricate and difficult matters of details are thus turned into an engaging reading and the book is prevented from becoming turgid or dull.

I have no doubt that Prof. Bijlani's book will be interesting alike to academicians, engineers, planners, administrators, citizens and laymen interested in the vital problems of urban development.

NEW DELHI
JULY 23, 1977

SIKANDER BAKHT
*Minister for Works & Housing, Supply
and Rehabilitation*



Preface

The urban problems in developing countries have to be studied within the constraints of limited finances, social and cultural habits of people and the present trends of technological progress. Many planners and technicians trained in the rich and advanced countries of Europe and U.S.A. have tried to import into developing countries, planning principles and methodologies which are just not applicable to them. Planning education must be problem-centred. Hence it is essential that those who are required to deal with urban problems in developing countries should have opportunities to face these in the field and utilize the practical knowledge thus acquired for purposive and socially-beneficial action.

The Centre for Urban Studies in the Indian Institute of Public Administration, besides handling urban studies and research projects, also handles a number of training programmes for Local, State and Central Government officers employed in the field of urban development all over the country. In this context the Institute has to make every possible effort to provide first-rate facilities for orientation and mid-career training. One of the important steps thus is to bring about an awareness of urban problems through books which deal with our experience, our way of life and the way we could handle these situations within the given constraints. Such books would not only be useful in institutions dealing with the subject formally but would also provide a medium for informal education amongst citizens and thereby help create an awareness of urban problems amongst them as well.

Mr. H.U. Bijlani, Professor, Centre for Urban Studies, in this Institute has had long association with problems of urban development and urban renewal. As Chief Engineer in the City Government of Delhi for over a decade he had to grapple with a variety of problems characterized by rapid population growth, urbanization, inadequate administrative structure, limited financial resources and ecological apathy. Some of the problems handled by him provide visible landmarks in the capital in the form of a series of flyovers, improved road network, environmental improvements in hundreds of uncontrolled settlements and infrastructure facilities in the form of health, education, and community development programmes. While working in the field, he had opportunities to write about some of these experiences in the form of monographs and papers which were presented by him at international and national seminars. To these he has added material in which he has looked back from his present assignment. The book as such deals with a variety of urban problems, viz., poverty and over population, slums, the legal provisions, transport problems in congested areas, pollution, quality of life in cities and

case studies in urban planning. The book fulfils a long-felt need of highlighting urban problems in the context of a developing country and deals with situations that call for an approach different from what has been adopted in the rich developed countries of the West.

NEW DELHI
SEPTEMBER, 1977

R.N. HALDIPUR
Director
INDIAN INSTITUTE OF PUBLIC ADMINISTRATION

Acknowledgements

This book is a product of face-to-face and mind-to-mind contact with a large number of people, associations, institutions and offices. The number, in fact, is so large that it would be impossible for me to list them all.

Several friends spared their valuable time to go through the manuscript in parts or in full and then offered valuable comments. Amongst them I am grateful to Shri Sikander Bakht, Minister for Works and Housing, Supply and Rehabilitation, for doing so and then write a foreword to the book. I also thank Shri R.N. Haldipur, I.A.S., Director, Indian Institute of Public Administration, for not only writing a preface to the book but also for the constant interest that he took in getting the book published.

A special note of gratitude is owed to my colleague Shri M.K. Balachandran for cheerfully helping me in going through the proofs and Miss Kamlesh Tuteja for assisting me in preparing the index.

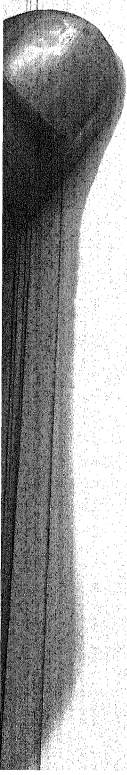
I must also thank Shri N.R. Gopalakrishnan and his team in the Publication Section of the IIPA for giving me all the help in bringing out this book and Shri Mohinder Singh, Librarian and Mrs. S. Bakshi, for helping me to prepare the bibliography.

To Shri B.S. Rana, my stenographer, goes the credit for putting up with my impossible demands of typing and retyping the manuscript again and again.

H.U. BIJLANI

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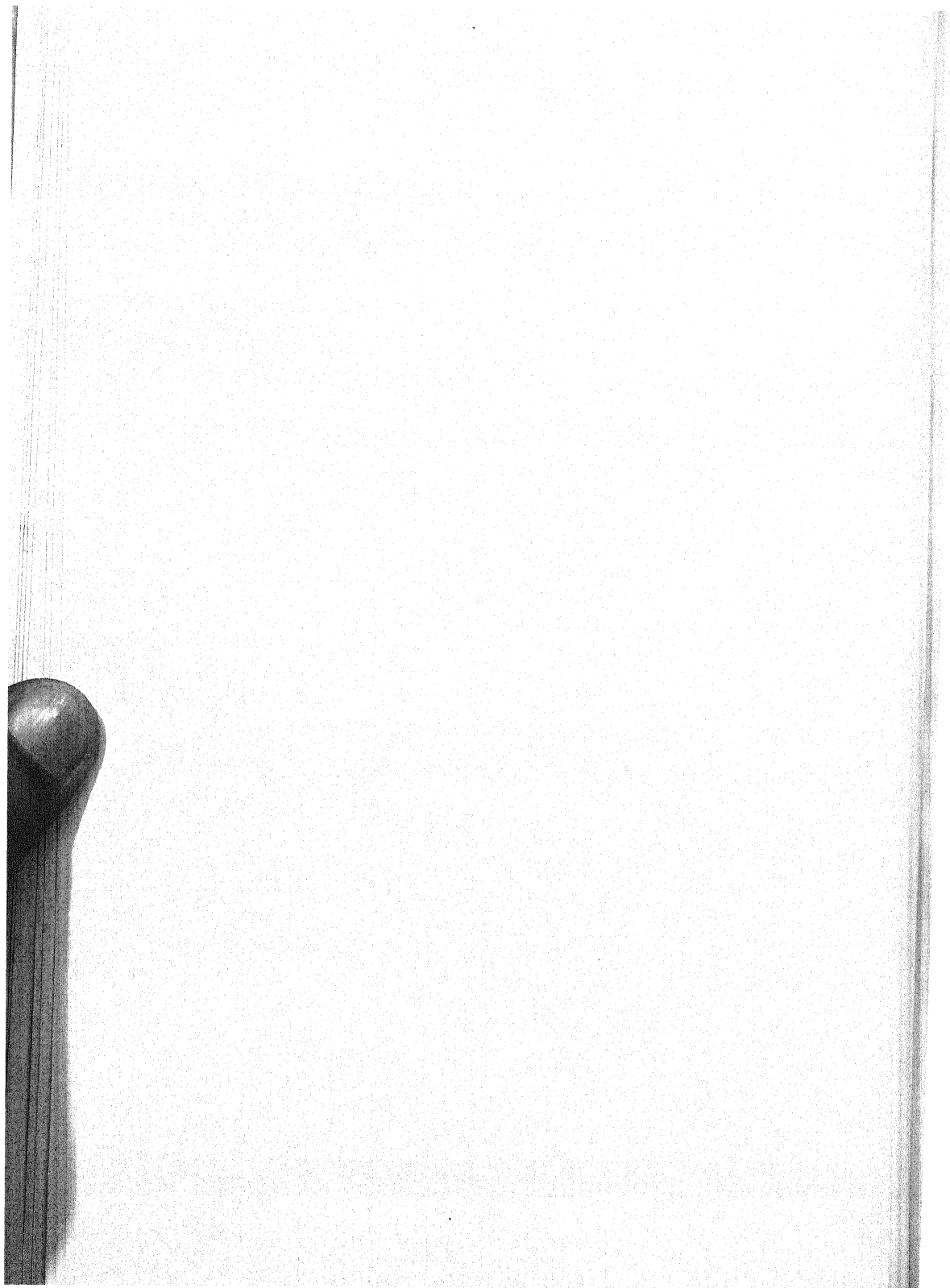
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Introduction

The growth of urban life has been one of the most striking developments in the history of mankind. The phenomenon is undoubtedly of recent origin if we were to view history in one single sweep. But even if we were to look at the last two or three centuries, we are apt to be struck with awe by the fact that the pace at which cities and urban life itself have grown is unprecedented and breath-taking by any standards. And this is true not only if we look at urbanisation as just patterns of human settlement but even when we go on to view it as a way of life. The trends which led to increased urban growth in the past have only intensified in the present century and in the decades we have just lived through and futurologists are fully agreed that there is to be no looking back whatsoever.

It is, therefore, not merely appropriate but pressingly urgent and a matter of the greatest consequence to reflect on the problems involved in urban growth; to speculate on the implications of alternative choices; to let the most imaginative minds dream of what human dwellings and environment in cities are going to be like and to get some of the best of us to translate those dreams into reality. While resources are limited and problems and pressures many, we have to build upon faith rather than despair; and there can be no doubt that faith in one particular resource will for ever remain unerring—namely, faith in human ingenuity, in man's vision of the future and in his capacity to create harmony and beauty in the face of the most formidable difficulties and limitations.

When we think of the "city beautiful" we find that we are face to face with an idea that has many mansions. There cannot be beauty without convenience. Even the grandest of edifices and the most beautiful layouts will fail if the citizen's comfort and facilities have been ignored. A great city will turn to advantage the migration of rural dwellers into its precincts by orderly and planned absorption although it will still look for the larger metropolitan and regional planning processes to ensure its restriction to the minimum. The planners and citizens will like to ensure that the environment is preserved, that relocation of dwellings or industry takes place in an ordered fashion, and that the citizen does not feel alienated or placed in the midst of strange or hostile surroundings. The essence of it all lies in the city inspiring a sense of pride among its inhabitants. And when the city expands, it should not shock its residents or neighbouring areas but rather surprise them pleasantly with its graceful and artistic growth. Its sprawling gardens, its places of recreation,

its theatres or play grounds should fill them with joy. The need is always for a greater dreamer and a relentless will to pursue a plan imaginatively outlined. Whatever be the circumstances, nothing can be achieved without the citizen's active participation in all processes of planning and execution.

The problem has kept me preoccupied for upward of two decades in different capacities when I hoped, feared, planned, executed, achieved results and some times failed. I have just one confession to make: it was a magnificent preoccupation. I often had the chance to give expression to some of my views on the subject on diverse occasions before different fora in India and abroad. Quite a few of these articles or speeches are here utilized with suitable adaptation. The mood differs but the preoccupation is the same. I have sometimes mused from an armchair and sometimes spoken from the dust and din of battle. But I fancy that most of the time the vision and the dream beckoned me.

The UNESCO meeting of experts held at Chandigarh in December 1976 recognised that awareness of urban problems needed to be aroused not only early in life at school but by setting up special programmes through non-formal education and mass media. I fondly hope that this book will contribute to this larger awakening.

2

Poverty, Colour and Over-Population*

According to Bertrand Russel, before the end of the present century, unless something quite unforeseeable occurs, one of the three possibilities will have been realised. These three are:

- I. The end of human life, perhaps of all life on our planet.
- II. A reversion to barbarism after a catastrophic diminution of the population of the globe.
- III. A unification of the world under a single government, possessing a monopoly of all the major weapons of war.

Many sober men of science do consider the first possibility (*i.e.*, the extinction of human race) feasible, in case the cold war of nerves one day triggers off the atomic warfare, releasing radio active clouds which may drifting round the world disintegrate living tissues everywhere. With a comparatively soothing and sobering atmosphere now prevailing in world affairs, this possibility seems to have somewhat receded. The third possibility, that of establishment of a single government for the whole world, seems to be more utopian in nature than practical. In any case, even if such a world government comes into being it will be imposed by force and certainly not by agreement.¹

The second possibility, that of a reversion to barbarism, is interestingly akin to the answer that M.I.T's mega computer produced after all relevant trends were fed to it. Since just about all the globe's best land is already under cultivation, farm production can rise only through use of tractors, fertilisers, pesticides—all products of industry. But more industrial output not only demands a heavier draw on natural resources that are scarce even now, it also creates more pollution and food. Computer expert Dennis Meadows fed M.I.T's mega computer with an array of data ranging from expert opinion to hard facts—the world's known resources, population growth rates, incidence of pollution connected with nuclear power, plants etc. The question Meadows had to answer was: How long can population and industrialization continue

* The article was published in *The Sunday Statesman*, Delhi, March 20, 1977 under the caption: "Poverty, Colour, Population".

¹For a description on the future of mankind, see Bertrand Russel, *Unpopular Essays* (1950).

to grow on this finite planet? The answer was that depletion of non-renewable resources will probably cause the end of civilization enjoyed by today's contented consumer.²

Lin Piao, once Mao's designated successor, propounded a theory according to which the growing gap between the rich and poor countries constituted the greatest menace to the peace and progress of this world during the present century. His thesis rests on ultimate confrontation between what he picturesquely labelled as the "Cities of the World" and the "Villages of the World". The "Cities" according to him were the Western Europe and North America, the "Villages" being Asia, Africa and Latin America. According to Lin, China desires revolution in as many places as possible, telescoped quickly one into the other and culminating in the overthrow of cities by villages.³

On the other side, colour line has been a favourite theme of African thinkers for some time past and according to them colour line will be the battlefield of human race. Dr. William E.B. Du Bois, an American negro, as far back as 1910, canvassed this theory at the first Pan-African Congress in London when he said that "the problem of the twentieth century is the problem of colour line—the relation of the lighter to the darker races of men in Asia and Africa, in America and the islands of the sea".⁴

Yet another line was drawn in 1960 through a survey conducted by the United Nations classifying regions by recency of urbanization.

1. Early urbanized: Regions at least 25 per cent urbanised by 1920. These would be Western and Northern Europe, Northern America, temperate South America, Australia, New Zealand.
2. Recently Urbanised: Regions at least 25 per cent urbanised by 1960 but not by 1920. These comprise Southern and Eastern Europe, Japan, Northern Africa, Southern Africa, Tropical South America and Middle America.
3. Least Urbanised: Regions under 25 per cent urban in 1960. These are main land East Asia, South and South-East Asia, the Middle East, South-West Africa, the Carribean and tropical Africa.

If we look at the average annual rates of population between 1920 and 1960 for the above three stages expressed as percentages the same will be as follows :

	Urban	Rural and Small Town
1. Early Urbanised	1.8	0.4
2. Recently Urbanised	3.2	0.6
3. Least Urbanised	3.8	1.0

²Time, January 24, 1972.

³Frank Moraes, *Witness to An Era* (1973), pp. 285-286.

⁴*Ibid.*

It will be seen that the average annual rates of population growth are more than double in case of "Least Urbanised" category as compared to "Early Urbanised" stage. In other words, countries falling in the region of mainland East Asia, South and South-East Asia, the Middle East, South-West Africa, the Carribeans and tropical Africa which already have a wide population base are out-numbering the region in the first category at an alarming pace.⁵

At some point the boundaries drawn by Lin and Du Bois coincide because the division between rich and poor approximately tallies with the division between white and coloured. Same is the case with over-population as revealed by the survey carried out by the United Nations in 1960. The whites belong largely to the world of riches and coloured to the world of poverty. Both poverty and colour mark a region which is also experiencing population explosion.

This increasing gap between have and have-not countries of the world can have same unhealthy results as a country which within itself has a wide gap between the rich and the poor. The rich nations, however, cannot be blamed entirely for creating a human crisis and not helping the poor nations out of their dilemma. The underdeveloped countries have also to work up to curb the increasing population trends, increase their social disciplines and organise their economies and root out corruption.

There is a peculiar trend of population explosion in this region—popularly known as a region of developing countries. Most of these developing countries are experiencing an increase of total population between $2\frac{1}{2}$ per cent to 3 per cent every year. This increase is the net result of high rate of birth and declining mortality due to application of present day medical innovations. On the other hand agricultural technology is comparatively primitive. Thus, this region produces a surplus of human beings rather than a surplus of agricultural products resulting in poverty, underdevelopment and unemployment. The entire world is becoming increasingly urbanised. During the period 1900 to 1970, whereas world population doubled from less than 2 billion to 3.6 billion, the urban population increased six-fold from 224 million to $1\frac{1}{2}$ billion. Projections for rural and urban population growth to year 2000, indicate increase both rural and urban, greater in developing region than in industrialised countries (See Fig. 2.1).

In spite of the fact that present trend in industrialised countries indicates saturation level of urbanisation and stabilisation of urban-rural ratio and that they will have only natural growth of population to look after, the prospects of continuing prosperity by no means seem assured. One important factor often overlooked or ignored is the accelerated utilisation of natural resources—supplies of which are both limited and finite. These natural resources are being squandered away and sooner or later when these resources get exhausted there will be a telling effect on the present day advantages of urbanism in

⁵Noel P. Gist and Sylvia Fleis Fava, *Urban Society*, (1974), pp. 109-110.

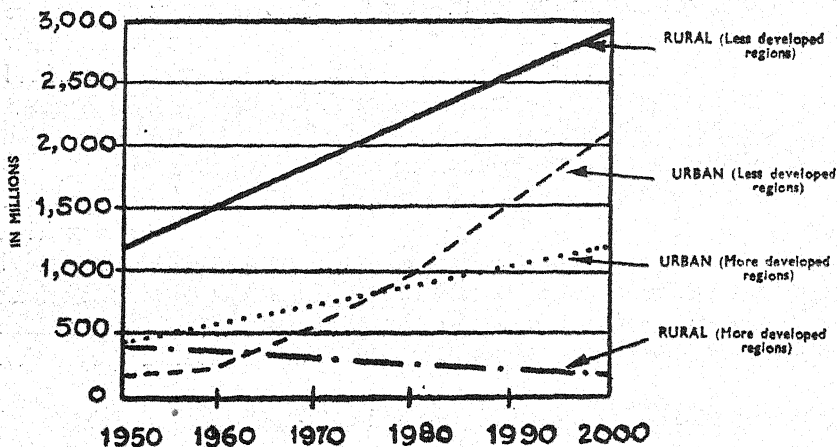


Fig. 2.1. Population projection to the year 2000 A.D. of rural and urban population in less developed and more developed regions.

SOURCE : Population bulletin (April 1971) Based on data from U.N., A concise summary of the world population situation in 1970, N.Y.U.N. 1971.

these countries. Man, in these countries, is so radically altering the ecological situation that he is almost destroying nature—completely forgetting that nature made man and man made culture and that culture in turn makes man. Disruption of this cycle by ecological destruction and environmental pollution is already jeopardizing the quality of life in cities. In addition to this will be the telling effect on urban sprawl because of foreseeable changes in transportation due to shortage of fuel. As it is, today, in the words of Frank Lloyd Wright, it is easier to get some places crawling over the tops of New York taxi cabs than inside one.

The situation in developing countries is worst. In case of South Asia alone, according to Irene Taeuber, if mortality rates continue to decline and if birth rates remain unchanged, the population will increase from 858 million in 1960 to 2.6 billion in the year 2000—a three fold increase. This single region's population would be larger than earth's entire population in 1950. It is well nigh impossible to increase productivity to such an extent so as to properly employ, feed, clothe and house such a population. It is, however, unlikely that South Asia and other similar developing countries will bulge with population to that extent in the year 2000. The Malthusian scourge of disease and destruction will take care of that possibility if over-population is not controlled.

Bertrand Russel's possibility of "reversion to barbarism after a catastrophic diminution of the population of the globe" seems imminent unless saner counsel prevails on man to conserve natural resources and exercise effective control over-population explosion.

3

The Slums and India*

The problem of slums in India is cast on an epic scale: no other epithet seems to answer the description in a satisfactory measure. Judged from the size and immensity of its problems, the country is a continent, if not a world in itself. In terms of area, its land envelope is 1,257,115 sq. miles which is nearly three times that of Colombia. Its population is 520 million;¹ in fact, one among every seven persons in the world is an Indian. The biennial increase of India's population is equivalent to the total population of Colombia. While the total geographical area of India is two-fifths of that of the United States, its population is two and a half times larger. It is undoubtedly true that India cannot be said to be the most densely populated country of the world with a density ratio of 440 persons per square mile; yet she has some of the densest conurbations. The Netherlands with her 950 persons per square mile, and Japan with 700 persons per square mile, leave her far behind in this contest, but from the point of view of concentration of human population in a few selected pockets, India almost leads the rest.

India is known to live in the villages, but surprisingly her 90 million people, representing 18 per cent of her total population, today live in urban areas. The one-fourth of this urban population lives in her largest fifteen big cities like Delhi, Calcutta, Bombay, Madras, etc. It is even more significant to note that the rate of growth of population of these cities is far in excess of the rate of national growth, since, in addition to the normal population growth, there is additional gravitation of people, in search of employment to these centres, due to the magnetic pull of these metropolitan regions (Table 3.1). This, in fact, is a world-wide phenomenon. In this context, as Barbara Ward aptly puts it, the distinction between a developed and a developing country does not seem to be significant. "Everywhere, without exception, the growth of population in towns is greater than the average rate of expansion. If the world's general rate of growth is about 2 per cent a year,

* Monograph presented at the Inter-regional Seminar on Improvement of Slums and Uncontrolled Settlements, Medellin, Colombia, 15 February to 1 March 1970, held under the aegis of United Nations.

¹India's present day population of 580 million is distributed in 5,78,842 human settlements of various sizes. Out of these nearly 450 million live in villages and the rest 130 million in 3,121 towns and cities of various sizes ranging from 5000 to over 5 million people. According to present population trend, India is to have 945 million in 2001 A.D. Out of these 667 million will be in rural areas and 278 million in urban areas.

towns are growing by 4 per cent a year, some big cities by 5 and 6 per cent a year, some even by 8 per cent a year."²

Table 3.1
INDIA — RURAL AND URBAN POPULATION 1921-1961³

Census Year	Percentage of total population	
	Rural	Urban
1921	88.6	11.4
1931	87.9	12.1
1941	86.1	13.9
1951	82.7	17.3
1961	82.0	18.0

SOURCE : Economic Information 1968, Government of India, Ministry of Finance, Department of Economic Affairs.

As for example, according to demographic forecasts, population increase in Delhi, the capital of India, would be at the rate of 200,000 per annum. The rate of growth will thus be about 6 per cent, as against the national average of 2 per cent. In twenty years after the attainment of independence, the population of Delhi rose from 11 lakhs⁴ in 1947 to an estimated population of 37 lakhs in 1967 (Table 3.2).

Table 3.2
POPULATION TREND IN DELHI 1901-1967⁵

Year	Population
1901	405,819
1911	413,851
1921	488,452
1931	636,246
1941	917,939
1951	1,744,072
1961	2,658,612
1966 (estimated)	3,400,000
1967 (estimated)	3,700,000

SOURCE : Planning Commission, Expert Committee's Report, March 1966.

²Barbara Ward, "The Processes of World Urbanisation", in *Planning of Metropolitan Areas and New Towns*, United Nations publication, 1967.

³According to 1971 Census, India's total population was 547,949, 809 with 19.91 per cent as urban population.

⁴1 lakh = 0.1 million.

⁵As per 1971 census figures, Delhi's total population was 4,065,698.

There are areas in Delhi where the density of population is 350 persons per acre or 224,000 persons per square mile.⁶ According to a survey carried out by the Bharat Sewak Samaj, the average density of population for Old Delhi is between 400 to 600 persons per acre and in some of its areas the density is even as high as 1100 per acre or 704,000 per square mile.⁷ In other cities of India also the population has been increasing at a fantastic pace.

Apart from this phenomenal growth in urban population the staggering inequality in the income of the various sections of the population is so painfully evident to any student of Indian economic conditions. According to the latest estimates of the Central Statistical Organisation even though the per capita income of an Indian is rupees 323 per annum, a vast majority of the people in India live on much less. However, a glaring contrast is provided by a group of some 10,000 people each earning more than rupees 50,000 per annum, which indeed is appalling.⁸ India's Five Year Plans have been aiming at levelling this down to a ratio of 1:30, without any prospect of being able to achieve this object in a foreseeable future. The result is that one often comes across multi-storeyed monuments, unrivalled in design and execution, surrounded reproachfully by innumerable "jhuggies" or huts.

There is something of the timeless about slums in India. Like the hills or the sunset, one does not know how long ago these had their beginning in time. If one grows up with something, one's sensibility is coarsened and the most sub-human conditions of living fail to arouse reactions. That perhaps happened to slums in India till she attained independence. While it is true that newer and newer problems arise as time passes and new slums are born while old ones expand and worsen, a certain awareness of the appalling conditions prevalent in such areas has developed over the years. It is common knowledge that Mahatma Gandhi always stayed, out of choice, in the scavengers' colony in Delhi, and that Jawaharlal Nehru never lost an opportunity of visiting slums whenever one came his way when he happened to be visiting a town. The city where he saw these slums most was of course, Delhi, the capital of India. "Every time I have visited them", he said, "I return with a certain feeling of numbness and an urgent desire to have something done to remove these slums."⁹ Small wonder, therefore, that soon after the setting up of the Planning Commission, of which the Prime Minister of India has continuously been the Chairman since its inception, the problem of slums and housing received great attention. Quoting the decennial increase of population during census years 1931, 1941 and 1951, as 11 per cent, 14.3 per cent and 13.4 per cent respectively, the First Five Year Plan (1951-56) brings out incisively corresponding increase of population in urban areas as 21 per cent,

⁶As per Master Plan for Delhi, Sept., 1962.

⁷*Slums of Old Delhi*—A Survey Report by Bharat Sewak Samaj 1958.

⁸S. Chandrasekhar, *American Aid and India's Economic Development*, F.A. Praeger, New York, 1965.

⁹*Slums of Old Delhi*—op. cit.

32 per cent and 54 per cent. The 1961 census indicated percentage population variation, compared to preceding census, at an alarming figure of 21.5 per cent (Table 3.3).

Table 3.3
DECENNIAL GROWTH OF POPULATION 1911-1961¹⁰

<i>Census Year</i>	<i>Population* (Million)</i>	<i>Percentage variation compared to the preceding census</i>	<i>Sex Ratio* (Number of females per 1000 males)</i>
1911	252.1	+ 5.73	964
1921	251.4	- 0.31	955
1931	279.0	+11.01	950
1941	318.7	+14.22	945
1951	361.1	+13.31	946
1961	439.1	+21.50	941

* Excludes for 1911-51 the population of NEFA and includes all the Nagaland (except Tuensang District). For 1911-61 excludes Pondicherry also.

SOURCE : Economic Information, 1968, Government of India, Ministry of Finance, Department of Economics Affairs.

The First Five Year Plan also spells out liberal subsidies to the extent of 50 per cent of the total cost of projects, and long-term loans to State Governments and Cooperative Building Societies of middle class and other low income groups. For clearance of slums, it says: "The procedure to be adopted in such cases should be simple and of a summary nature. The competent authority should, after proper survey and enquiry, issue a clearance order. Compensation should be assessed on the basis of the use to which the land was put on the date of the issue of the clearance order. We suggest that no additional compensation on account of the compulsory nature of acquisition should be allowed in case of acquisition of slum areas, because we believe that such compensation ought not to be admissible to properties which are not put to social use. We do not think that the owners of slum areas perform any social service by accommodating large number of the poorest sections of the community in conditions of squalor and filth and we do not see why such social abuse of property should be compensated for over and above the actual value. We agree, however, with the suggestion that where the owners of slum areas themselves come forward to re-build and develop their

¹⁰According to 1971 Census, India's total population increased to 548 million with growth rate of + 24.79.

properties within a specified period, on standard plans to be approved by the competent authority, there may be no need for acquiring such lands for the purpose of clearance of slums.”¹¹ The Plan outlay for the First Five Year Plan period 1951-56 for housing was rupees 49 crores and the actual outlay rupees 33 crores. In terms of tenements, 42,200 tenements came up during this Plan period.

The Second Five Year Plan (1956-61) continued to dwell upon the specific subject of Slum clearance and Sweepers' Housing. It drew attention to the need for two sets of measures : first, a strict enforcement of municipal bye-laws and the enlisting of support from the enlightened public opinion and, second, the framing of master plans for every town, beginning with towns which are already large or have expanded much in recent years or are likely to grow rapidly in the next few years. State Governments were asked to undertake social and economic surveys of their worst slum areas in the larger towns and to draw up phased programmes of slum clearance. The scheme was based on two principles, first, the minimum dislocation of slum dwellers and re-housing them, as far as possible, at or near the existing sites of slums, and second, greater emphasis on the provisions of minimum standards of environmental hygiene and essential civic amenities, rather than on the construction of elaborate structures in order to keep the rents within the paying capacity of the slum dwellers.¹²

The Plan provision and actual outlay for the Second Five Year Plan (1956-61), for public sector under housing, were rupees 84 crores and rupees 85 crores respectively. These covered a wide range of schemes on subsidised industrial housing, slum clearance, low income group housing, village housing, plantation labour housing, middle income group housing in Union Territories, State housing schemes, land acquisition and town planning. Nearly 95 per cent of the expenditure, however, was incurred on first four schemes. By the end of the Second Plan, 208 projects costing about rupees 19 crores and involving re-housing of 58,200 families living in slum conditions were taken up in different towns and cities. About 3,700 villages were selected and socio-economic and physical survey of about 2,000 villages were finalized. Layout plans of 1,600 villages were drawn up, 3,000 houses completed, and loan for construction of another 15,400 houses sanctioned for construction.

The Third Five Year Plan (1961-66) envisaged the plight of such families as could not afford to pay even the subsidised rents of “pucca” structure.¹³ Schemes were formulated for skeletal housing and open developed plots with a separate washing platform and latrine for each family, leaving it to the

¹¹*First Five Year Plan*, Government of India, Planning Commission, New Delhi, 1952.

¹²*Second Five Year Plan*, Government of India, Planning Commission, New Delhi, 1956.

¹³*Third Five Year Plan*, Government of India, Planning Commission, New Delhi, 1961.

slum dwellers to build huts of a prescribed pattern themselves on a self-help basis. By now the experience indicated that implementation of slum clearance schemes and improvement programmes was a lengthy, time-consuming affair beset with hurdles ranging from high costs of alternative sites near existing places of work, the inability of the slum dwellers to pay even the subsidised rents, and their reluctance to move from the areas selected for clearance. The schemes had, therefore, to be reviewed. While long-term plans had their over importance, they failed to provide immediate relief to the large population of slum dwellers living in sub-human conditions of acute distress. The scope of slum clearance was thus enlarged to embrace slum improvement also, by which minimum amenities like sanitary latrines, drainage, uncontaminated water supply, approach roads, paved streets and lighting could be provided. Large resources were made available for dealing with slum problems in six major cities, namely, Delhi, Calcutta, Bombay, Madras, Kanpur and Ahmedabad. In these cities total subsidy for slum clearance was raised from 50 per cent to 62 per cent and the Central Government's share in it was increased from 25 to 37½ per cent.

The expenditure incurred in the Third Five Year Plan on different schemes in Housing Programme is shown in Table 3.4.

Table 3.4
HOUSING PROGRAMME: EXPENDITURE IN THE THIRD FIVE YEAR PLAN

<i>S. No.</i>	<i>Scheme</i>	<i>Plan funds</i>	<i>LIC funds</i>	<i>Total</i> (Rs. crores)
1.	Subsidised industrial housing	22.40	—	22.40
2.	Low income group housing	21.95	13.66	35.61
3.	Plantation labour housing	0.15	0.11	0.26
4.	Village Housing Schemes	4.22	0.73	4.95
5.	Slum Clearance	26.90	—	26.90
6.	Land Acquisition Development	9.12	15.34	24.46
7.	Middle income group housing	2.56	19.92	22.48
8.	Rental housing scheme for State Govt. Employees	—	10.24	10.24
9.	Dock labour housing	0.14	—	0.14
10.	Experimental housing and statistics	1.00	—	1.00
11.	Office residential accommodation	28.50	—	28.50
	Total	116.94	60.00	176.94

SOURCE : Draft Fourth Five Year Plan 1969-74, p. 325.

Table 3.5 gives a summary of actual outlays in Public Sector on Housing in all the three Five Year Plans, from 1951 to 1966, as well as the three Annual Plans for the years 1966-67, 1967-68, and 1968-69. This gives clear financial perspective of efforts made by the Public Sector in the context of problem of Housing as a whole.

Table 3.5
ACTUAL OUTLAY FOR PUBLIC SECTOR UNDER HOUSING

	<i>Actual outlay under housing (Rs. crores)</i>	<i>Remarks</i>
First Five Year Plan (1951-56)	33	—
Second Five Year Plan (1956-61)	85	—
Third Five Year Plan (1961-66)	112*	*This figure as given in Draft Fourth Five Year Plan is Rs. 116.94
Annual Plan (1966-67)	22	
Annual Plan (1967-68)	27	
Annual Plan (1968-69)	23**	** This figure indicates Plan Provision.

SOURCE : Central Statistical Organisation, Department of Statistics, Cabinet Secretariat, Government of India, Statistical Pocket Book, India, 1968.

Total number of tenements, likely to be built by 1968-69, is given in Table 3.6.

Table 3.6
NUMBER OF TENEMENTS LIKELY TO BE BUILT BY 1968-69

<i>S. No.</i>	<i>Scheme</i>	<i>Year of introduction</i>	<i>Tenements likely to be built by 1968-69</i>
1.	Subsidised housing schemes		
	(i) Subsidised housing schemes for industrial workers and economically weaker sections.	1952	1,70,000
	(ii) Slum clearance and improvements	1956	1,15,000
			} 2,85,000
2.	Loan schemes		
	(i) Low income group	1954	1,20,000
	(ii) Middle income group	1959	
	(iii) Rental housing schemes for state employees.	1959	35,000
			} 1,55,000
	Total schemes	—	—
			4,40,000

SOURCE : Fourth Five Year Plan 1969-74 Draft, p. 319.

Beginning from April 1969, the Fourth Five Year Plan (1969-74) of the country will be embarked. The working group set up to examine the nature and extent of the housing need and formulate proposals, has painted a dismal picture on the basis of a Ten-year perspective. The next decade according to them will witness an unprecedented pressure on our housing resources. Not only will it commence with a backlog of 837 lakh housing units, but also add about 100 lakh new families to the effective demand. In Urban housing, shortage amounted to 28 lakhs units in 1951, 50 lakhs in 1956, 93 lakhs in 1961, 118 lakhs at the end of 1967 and about 119 lakhs in April 1969, when the urban population was more than 9 crores. About 25 lakhs additional units will be required for new families during the next decade. Again, ten lakh units of the existing housing stock of 110 lakhs would need replacement during the next ten years. The overall shortage in urban housing projected over the next decade thus works out to 154 lakh units. In rural housing, the story is no different. The overall shortage in rural areas was 565 lakh units in 1961, 696 lakhs at the end of December 1967 and about 718 lakhs on April 1969 when the rural population was more than 43 crores. Another 75 lakh housing units would be required to cover the anticipated increase, and about 11 lakh housing units will have to be replaced, aggregating to total requirement for rural housing at a mammoth figure of 800 lakhs during the next decade. Against this the estimated rate of construction in urban area has been about 3.5 units per 1,000 persons per year and that in rural areas about 0.44 units per 1,000 persons per year.¹⁴ The overall annual rate of construction in both urban and rural areas thus works out to 2 houses per 1,000 persons. The expert body of the United Nations has recommended construction of 10 houses per year per 1,000 persons.¹⁵

In computing this shortage, the fundamental assumption was that each household should have a separate "pucca" dwelling unit, a reasonably permanent structure to provide minimum standards of comfort and safety. In terms of money it would call for an investment of about Rs. 33,000 crores to wipe off the entire shortage. This does not include the cost of urban and rural planning, laying of roads and streets, sewerage and the provision of innumerable other facilities and amenities for healthy neighbourhood. The nature and extent of the problem being so vast and complex, it can be safely presumed that Government cannot solve it on its own. The working group on housing

¹⁴S. Mahadeva Ayyar in his paper "Impact of the Urban Land (Ceiling & Regulation) Act, 1976, on Housing—Need for Study", presented at a Seminar on Law and Urban Land held at the Indian Institute of Public Administration on January 28-29, 1977, reports the present housing shortage based on the preliminary data of the census of 1971 and the increase in households due to natural growth of population and net addition to housing stock during 1971-74, on the eve of the Fifth Plan as estimated to be 15.6 million units—3.8 million units in the urban areas and 11.8 million units in the rural areas. This shortage, he says, is estimated to increase to 65.6 millions in 2001 A.D.

¹⁵*Report of the Working Group on Housing for the Fourth Five Year Plan*, Government of India, New Delhi, 1968.

therefore made some specific suggestions to boost the housing construction in the public as well as private sector. These include: (i) grant of tax concessions and other incentive to private capital to invest in housing; (ii) promoting private savings for housing by activating housing corporations; (iii) establishment of a sound institutional framework of housing, that is a central housing authority and statutory housing boards at State levels; (iv) introduction of a house mortgage insurance scheme; and (v) encouragement to commercial banks to invest part of their funds in housing. The working group also recommended a 400 crore rupees outlay in the new Fourth Five Year Plan as against a figure of 233 crore rupees for social housing schemes indicated to them as a guideline. The proposed provisions in the draft Fourth Five Year Plan for Housing and Urban Development are given in Table 3.7.

Table 3.7

PROVISIONS PROPOSED IN THE FOURTH FIVE YEAR PLAN FOR HOUSING AND URBAN DEVELOPMENT

<i>S. No.</i>	<i>Item</i>	<i>Outlay (Rs. crores)</i>	
1.	State and Union Territories	136.70	136.70
2.	Central Scheme		
	(i) Office and residential accommodation for central government employees	30.00	34.00
	(ii) Dock labour housing	2.50	
	(iii) Experimental housing and research	0.35	
	(iv) Housing Statistics	0.35	
	(v) Town Planning including interstate regional plans	0.50	
	(vi) Local Self Government (Training and Research)	0.30	170.70
	Total (housing and urban development)		

SOURCE : Planning Commission, Fourth Five Year Plan 1969-74 (Draft).

The latest reports, however, indicate that the funds available for various social housing schemes (excluding slum clearance) in the Fourth Plan will be only about 63 crore rupees.

This stupendous shortage in housing and paucity of reasonably priced developed plots of land are the main causes of creation of slums and uncontrolled settlements in large metropolitan towns in India. In whole of India, the Union Territory of Delhi had the highest percentage of urban population both in 1951 as well as in 1961. According to 1961 census, "the urban population constituted 82.40 per cent of the total population of the Union Territory in 1951. The corresponding percentage rose to 88.75 per cent in 1961. During

the decade 1951-61, the percentage increase of the urban population of Delhi was 64.17 per cent."¹⁶ Therefore, it is not surprising that more than 200 uncontrolled settlements, popularly known in Delhi as unauthorised colonies, have sprung up during the last two decades. The biggest single reason for such large-scale unlawful activity is that the unscrupulous well-to-do find that it pays, while the poor man is driven to it by the compulsions of the contemporary situation. No regular colony can afford to sell plots at the low rates as prevail in uncontrolled settlement. The unscrupulous well-to-do person finds it a lucrative business for he gets most willing buyers. The poor man has no alternative but to buy such plots, while the rich man finds big money in it. Most of these settlements are therefore the product of a remarkable co-operation between the rich and the poor. From the point of view of town planning, however, nothing can be more ruinous than these settlements. In a recent Seminar on "Problems of Unauthorised Construction in General and of Delhi in Particular" held on 28th and 29th November, 1969 in the Indian Institute of Public Administration, the unlawful activities responsible for growth of uncontrolled settlements were summed up in the following words: "This is an industry which knows no strikes and lockouts; shortage of raw material does not turn its shares bearish. No administrative hurdles impede its efficient course. Like Tennyson's brook it goes on for ever. Its spoils are shared by land pirates, while its price is paid by the town in terms of beauty and comeliness. Where we dreamed there should be a park, a festering slum is born; the plan of a school yields place to a heap of rubbish, and where our children were to swing or play ball, pigs and dogs and ghoulish creatures may abound. The selfish and unscrupulous share the spoils of a large scale loot, while the poor suffer and shrivel up in hovels that stink."¹⁷

The preceding paragraphs bring out in bold relief the prevailing awareness of the problem, and equally effectively the Public Sector's helplessness. The helplessness can be mainly attributed to the paucity of financial resources. We must therefore realise that since we cannot achieve the very best we should be flexible enough to adopt the approach which can atleast better the existing conditions. It was mainly due to this reason that we have drawn up "Regularisation Plans" of such unauthorised colonies which are of substantial nature and fall in densely populated areas and do not violate the "landuse" pattern of the Master Plan for the city and can be fitted into a proper "layout/service plan". Owners of houses which are regularised have to pay development charges after taking into consideration the development that is needed in the colony. If the estimates for development of such regularised colonies are rationally worked out, a revolving fund can be created through which the

¹⁶*Census of India 1961, Delhi Distt. Census Hand Book*, Government of India, New Delhi.

¹⁷H.U. Bijlani, "The Problems of Unauthorised Construction in Delhi", All India, Seminar on Unauthorised Constructions, Indian Institute of Public Administration, New Delhi, November 1969.

development works can be executed and the fund replenished through recovery of development charges. One has, however, to be sure that the fund actually revolves. Such an approach may not bring about living conditions which can be termed as ideal from town-planning point of view but results have shown vast improvements in living conditions. In the remaining unauthorised settlements which cannot be regularised certain basic amenities must be provided till such colonies can be shifted and land put to proper use for which it is earmarked.

We must also bring down our standards of development which would result in twin advantage of producing, in a given time, larger number of well-laid-out plots with reasonable amenities, and reduction in overall cost of development. In large number of cases it may be well-nigh impossible for a civic body to take piped water supply and sewer lines next door to such far flung areas which are normally earmarked for developmental purposes. Instead of waiting for these amenities the plots could be developed cheaply and provided with hand pumps and other basic amenities. It may be argued that such arrangements would not be hygienically up to the mark. We should not however forget that bulk of population in the country find such arrangements quite agreeable in villages and in large number of urban areas which are without piped water supply and sewerage system. The underdeveloped countries should realise that with our omnipresent poverty our standard of development and construction need not be, and in fact cannot be, what we witness in other affluent countries. Our problem is that of providing shelter to our teeming millions, and not that of providing them with luxury. Our attempt should never be to plan "Garden Cities" at exorbitant cost but to avoid congestion and create an atmosphere in which human beings can breathe free and have basic necessities.

Similarly in the case of slums, clearance and redevelopment with subsidised housing can offer only limited possibilities of dealing with the problem in its total content. The prevailing ideas of whole-sale slum clearance and construction of costly housing must be abandoned and new ideas must be developed to solve the shelter problem and improve physical environments and the slum life. The practice of wiping out slums and re-locating their residents, besides being costly, may ultimately result in merely shifting slums from one place to another. As Ebenezer Howard puts it, in India, the "slums are more than aggregate of the physical surroundings; they are also a way of life". The fact that emergence of slums is the result of social degeneration and economic poverty cannot be ignored. The approach therefore has to be such that taking into consideration both the physical environments and the social and economic status of the slum dwellers, its execution should involve no harassment, no coercion and no adverse effect on the socio-economic conditions of the slum dwellers. Much can be achieved by phased provision of community facilities and services, by gradual improvements in the physical environments, by purposeful planning of colonies with simple yet useful structures, by

reorienting our economic policies to remove the imbalances in our society. And with these steps we can face with courage and confidence the twin challenge of urbanization and abysmal poverty.

It is appropriate that the problem of slums should be discussed under the auspices of the United Nations. The problem is international not merely in the geographical sense of being present in every country but in the sense of transcending all considerations of nation or religion or commitment to a particular ideological persuasion. When one sees fellow human beings living in veritable pig-sites one is confronted with a human problem and, by that token, a world problem or an international problem, and not merely an American or Colombian or Russian or Indian problem. The question we face is so basic: should we allow any human being, irrespective of his religion, nationality, colour or belief, to live in such beastly conditions? Should we allow human beings to live jammed like fish in a barrel in the midst of filth and stink and disease and without basic amenities? Does this spectacle evoke in us the sort of response we make to the spectacle of a great character in the meshes of suffering in Greek drama or in a great tragedy on the stage? This character epitomises the entire human situation and is in many senses the very symbol of humanity not in the sense of a statistical average of human lives but of representing that "common human", that essential character of humanity, which lies embedded in every human heart. Thus when a great tragic hero suffers in a play, the entire human race seems to suffer; and when men and women and children suffer the travail of an unbearable situation into which destiny or the concomitance of circumstances places them against their wish, the response must come not from a district or a province or a country, but from the entire family of nations, for it is a matter to be tackled by the entire family of mankind. Slums, more than any thing else, represent the crisis of human civilization. Civilization and slums cannot co-exist. Man must do something about them or revert by some atavistic process to the ape from which he evolved. The whole world looks up to the United Nations for responding heroically to this challenge.

4

Slum's Human Fabric

My elder brothers have a queer collection of friends. One of them, Rooplal, caused quite a sensation in our family when he suggested to my father that my elder brother should marry the daughter of a certain prostitute. He explained that he was collecting names of young men who would be prepared to do so and keep young girls living in brothels from adopting Mrs. Warren's profession. I was too young at that time to follow Rooplal's scheme but I know that my brother's name never figured in his list. It was through Rooplal that my acquaintance with slums started. I was about eleven years old when in Karachi, one evening, he came to our house and finding my brothers away sat down to have a chat with me. The conversation mainly centred round my school, studies and what I did during my spare time. It was in answer to the last query that I mentioned: "I just roam around the City." There came an amused look over his face and he offered, if I was free that evening, to show me a new world, a world that I never knew even existed in Karachi. I also have a faint recollection of his saying: "It's there that God lives."

We started immediately. It was late in the evening. We left the well-lit streets of Karachi and were moving in the direction of total darkness. After covering some distance I could decipher a few huts—some dimly lit and others totally dark. And then came the stench and stink of sewage and filth. A timely warning helped me keep my feet away from getting soaked in the open drain which took its course in the middle of the non-descript street. There were children naked and undernourished, women busy with their household chores and men—some sitting idle others coughing inside the dark huts. This was my first exposure to a slum. I had never before witnessed so much poverty and misery. This was indeed a new world. But where was God?

What surprised me most was that almost every one here knew Rooplal. We entered many huts and Rooplal spoke to all of them with a certain ease which comes only with years of acquaintance. Why did Rooplal come to these people? He was neither a political leader nor a social worker. Nor was he a wealthy man. He could make these people happy by merely talking to them. With some magic touch he could bring about a smile on their sad and listless faces. Like Edward Fitzgerald's alchemist he could in a trice: "Life's leaden metal into gold transmute".

Since that evening in Karachi, 40 years ago, my association with slums grew deeper and deeper. All over the world I found it is the same story, only the names are different. In India we call them "bustees", in Mexico "colonies

proletarias", in Venezuela "ranchos", in Turkey "gecekondu", in Peru "barriadas", in Tunis "gourbivilles". But they all mean the same thing—the spring points of disease where human beings live under sub-human conditions. I have seen the same sad faces in all such slums; what I have not been able to find are "Rooplals" who could bring a word of cheer, a smile, a little happiness to this unhappy lot. How do we produce such people? Will it make any difference to the slum dwellers if more people of this type come to them, will it be very costly to produce such persons or will money at all be able to produce them. These are questions to which I have been trying to find an answer all these years.

Whenever one talks of slums and uncontrolled settlements one usually equates the problem with housing. We have built thousands of tenements for slum dwellers and spent crores of rupees on environmental improvements. I have seen hundreds of slum clusters being transformed from filth and dirt and darkness into comparatively clean spots. To what extent does that affect the life of a slum dweller? Do the women, children and men living there get transformed or do they continue to live in some other type of hell which remains hidden from a casual visitor.

Let us not close our eyes to our limitations in the sector of housing. In the foreseeable future we will never be able to build houses and tenements for our slum dwellers. The working group set up to examine the nature and extent of "housing needs" has already painted a dismal picture on the basis of a ten-year perspective. In terms of money we need an investment of about Rs. 33,000 crores to wipe off only the shortage and this does not include the cost of development works and other services required for a healthy neighbourhood.

Thus we have to live with slums. It is a matter of small wonder, therefore, that we have started working in the direction of environmental improvements. This is essential. What is equally essential, but is lost sight of, is the need for talking to these people, for making them feel acceptable, for telling the women folk how they can keep their home and children clean, for telling the children what games to play, for telling the men what work awaits them in the world beyond the one they have known so far. Who should go to these people to tell them and speak to them about such matters, what exactly are the things to be told to them and conveyed to them, and how and in what manner are these stories to be unfolded?

Woman in the slum to my mind is the greatest sufferer. Unlike men and children, who go out to work and play, she has to remain within those surroundings throughout the day. She slogs and sweats for the whole day. She is not aware where her children go, what games they play and what acts they perform. She is ignorant about many things including how to guide her children to remain clean and keep away from disease. She needs guidance and education—a different type of education. Some one should talk to her—some one should be able to talk to her as a friend—unto whom she can confide. She has to confide many things. She wants to tell some one about the shame

that overpowers her when at night she has to sleep with her husband in the same room which is shared by many more including her own children. It's only a sheet of cloth that separates them from others in that room. With whom should she share this misery? What havoc would this create on the tender minds of half-awake children? Will they grow to hate their parents for this and will they get coarsened in their attitude towards life? The problem gets more complicated, when due to the urban pull over the rural population, the woman in question is a new comer to the slum from a rural village. She is the creator of the future and the child is the future itself. How do we then seek to attain the welfare and happiness of both the woman and the child in the slum who hold so much of the future in their hands?

We all idealise the child. "The child is father of the man", says Wordsworth and adds:

And I could wish my days to be
Bound each to each with natural piety.

In a slum however, the child suffers from many handicaps. Foremost amongst them is the neglect from parental care. The environment of the slum itself is one great handicap from which the child suffers. Should he be permitted to be a victim of such inequalities in a socialistic State? What can we do to remove such inequalities? We again come to the same proposition, *i.e.*, the need for properly trained and dedicated persons to guide and educate both the woman and the child in the slum.

I have seen these children grow and attain youth without any preparedness for work and employment. There is no adequate programme in our country to guide the youth in the slums about opportunities of training and employment available for him. Unaided and unguided he faces frustration and often attains the state of recklessness. His entire dream of being a useful citizen, of employment, marriage and social participation gets shattered. Even those few who are able to finish school or college education have to compete with the more privileged youth of upper classes and such a competition sows seeds of hatred. The result invariably leads to unhappiness.

What then is the solution? Next to providing environmental improvement, we have to evolve a programme of slum participation by which we can impart an education which is completely different from the normal meaning that the word conveys. For this education we need men and women in all age groups, truly dedicated and trained to advise and guide and make friends with the slum dwellers. I have seen many slums, carried out works of all nature to improve their lot, attended many conferences and seminars but no where did I find adequate stress on the human fabric with which a slum is woven. The human fabric continues to decay from birth till death and we feel adequately satisfied after carrying out a few environmental improvements and building some tenements which form new slums in time to come.

We who do not live in slums have this society somewhere at the back of our minds. We are, however, not frightfully in a state of flutter about it. In the meantime life is on an even keel, our children study in public schools and "we call the Friday good". Somewhere at the back of the mind is the vague tranquillising thought that in the Fifth or Sixth or Seventh Five-Year Plan we shall have built enough tenements to house those children of stink and filth and despair. How great is our capacity to delude ourselves and lull the qualms of conscience into sleep with thoughts of future date when things will be all right while ignoring the present anguish "and the fever and the fret" of today. "Thank Heavens", we seem to say "my child is not one of these". In the meantime, those "little faces cut in ebony" get born and crawl and perish or disappear into the dark underworld of crime.

What is the problem of these increasingly vast populations in our slums? What can be done to make life more bearable? What are the practical alternatives? How can this village belle overcome her sense of alienation in surroundings millions of light years away from her own? How can hope come stealing into her life and be translated into reality? How can that child with such bizarre happenings all around him put his chest out with faith and hope in a world tending to crush him down? How can he become a better citizen? How can a little amusement, a little recreation, a little diversion from a world of broken dreams or no dreams at all break what appears to be an eternity of despair? Churchill marvels in his War Memoirs how those pigeon-breasted boys roaming about in the streets of London were transformed during the days of the war. Can something similar happen to their counterparts in India in peace time?

5

The Problems of Unauthorised Constructions in Delhi*

I do not wish to give you an unmerited sense of guilt but statistically speaking ten among a hundred persons living in Delhi reside in structures which are wholly or partly under a notice of unauthorised construction. An unauthorised building has now come to be regarded as a feature of the landscape. It is there, but no one seems to be in an awful state of flutter about it. It is like establishing a reasonable relationship with God. He is there, but you don't seem to be terribly restless about Him. Or, to put it in a somewhat mundane style, it is like the seasonal cold or an attack of cough. It is there; it is mentioned; it blows over. I am reasonably certain that I am not exaggerating when I say that these structures have become part of life, the very stuff of which it is made.

THE ART OF UNAUTHORISED CONSTRUCTION

It takes some genius to produce a great masterpiece in the realm of art. Once in a while, a luminous mind lets the magic of his powers make a great artefact. The world looks at it with bated breath; humanity gasps for life. We thus have great galleries and we say: "Ah! there is a Michaelangelo; there a Rubens; there a Rembrandt; there a Cezanne!" But it certainly takes you some talent out of the ordinary, not just wickedness, to fool a curator to buy what was passed off as an old masterpiece while it was painted in the dingy corner of an apartment in the sixth decade of the twentieth century. It takes you some ingenuity to make a modern piece look like an antique and escape the discerning eye of a shrewd expert. When we leave the realm of art for the workaday world in which we spend the best part of our lives, we find it abounding in persons of great skill and cunning and ingenuity who have perhaps missed their vocation and who perhaps might have adorned the world of the Muses. You get hold of a chap who has evidently put up a building in the recent past. Only two months back, when you happened to pass by, you never saw a brick on that triangular piece of land at the road crossing.

* Paper presented at the All India Seminar on "Unauthorised Constructions" held at the Indian Institute of Public Administration, New Delhi during November 1969. Subsequently it was published in *Nagarlok*, April-June, 1971.

But now an old structure overlooks you disdainfully in all its antique, majesty. You look into all its details; you look up your records; you consult all sorts of people just in case your memory, already bending under the pressure of a multitude of things to note and remember, might be playing pranks with you. You apply the familiar methods of ascertaining the age of the structure. You examine its colour wash, its plaster and eventually take out a brick or two in your experienced hands. "Why, it's a Mughlai brick—the one which Shahjehan used for the Taj Mahal!" you exclaim, completely unable to manage this new discovery like the stout Cortez in Keat's Ode, the engineer with his men:

Look at each other with a wild surmise,
Silent, upon a peak in Darien.

I hope, ladies and gentlemen, you will forgive an erring engineer who quotes poetry and I trust you will not compare him with the Devil quoting the scriptures!

To return to the brick of the Mughal times, an enquiry is made into the mystery of the brick and it is revealed that there is a flourishing industry in Delhi which specialises in manufacturing bricks which look appropriately Moghul and the customer while placing order can choose the century to suit his requirement! To the manufacturer's knowledge of Indian history is added the ingenuity of the builder. A fire is lit up when a wall of Mughal bricks has been erected and it is exposed and treated to smoke and colourwash in an alternating sequence twice or thrice till the walls put on the convincing shade of sooty antiqueness.

I have given so far an account of the accomplishments of great minds—the masters, so to say. What the lesser mortals achieve may lack the finesse of these great minds but in sheer size and proportions, they pose to all those who have the well-being of the city in their hearts a great problem. Premises are locked from outside and all is quiet for all intents and purposes to the world outside while inside the premises comes up a monumental building. The entire situation is reminiscent of the great men in Longfellow's poem:

The heights by great men reached and kept
Were not attained by sudden flight
But they, while their companions slept
Were toiling upward in the night.

The only difference between Longfellow's great men and the unauthorised builders is that the heights of edifices put up by the latter are attained by sudden flight!

The building bye-laws of the Municipal Corporation of Delhi permit the owner of a plot to put up a compound wall to a height of $4\frac{1}{2}$ ft. in front and

7 ft. on remaining sides. He puts up this wall around and then places an old tin sheet over the two walls in a corner at the rear to begin with. After a few years the tin-sheet is replaced by a regular roof under the guise of repairs, permissible under the bye-laws.

In some cases a plot of land is purchased without any structure on it but the sale-deed mentions the buildings proposed to be put up by the buyer with the seller's consent and collusion. Later these buildings are constructed and are shown as old ones on the strength of the sale-deed. The age of the building is also quite often sought to be established by showing more accommodation than is actually owned while submitting information to the Municipal authority for purposes of house tax assessment. Instances are not lacking where the builder when prosecuted in the court of law for putting up an unauthorised structure on absolutely virgin land produced old house-tax receipts.

The vast majority of cases of unauthorised constructions are, however, those of blatant and flagrant violation of the law without an effort to camouflage such violation. Hundreds of colonies have come up in this manner.

THE REASONS

It is, therefore, important to ascertain the factors which contribute to unauthorised constructions. The biggest single reason for such large-scale unlawful activity is that the unscrupulous well-to-do find that it pays while the poor man is driven to it by the compulsions of the contemporary situation. In the West Zone of the Municipal Corporation of Delhi nearly 60 per cent of the plots of land were purchased at the rate of less than Rs. 30 per sq. yd. In fact, in Shahdara the percentage of such buyers was as high as 78. No wonder these colonies have the largest number of unauthorised buildings. Most of these buildings have come up on unapproved plots. No regular colony can afford to sell plots at such a low price. The unscrupulous well-to-do person finds it a lucrative business for he gets most willing buyers. The poor man has no alternative but to buy such plots while the rich man finds big money in it. Most of these colonies are, therefore, the product of a remarkable cooperation between the rich and the poor. From the point of view of town planning, however, nothing can be more ruinous than these colonies. The houses which come up in such colonies are unauthorised not only because the plots on which these were constructed are unapproved but because the building bye-laws have also not been observed. In a large majority of cases, even the elementary requirements such as a minimum setback have not been fulfilled. Moreover, insofar as the layout of such colonies has not been approved after a careful examination and scrutiny, there is a most shocking dearth of community services like roads, sewers, water supply, parks, etc. In fact in a large number of cases, construction of houses might not have been allowed at all if somebody had applied for the approval of layout plans.

The obvious reason for this state of affairs is that there are just not enough

houses going round for the rapidly increasing population of Delhi. The magnetic pull of this metropolitan town draws a large population from different parts of the country. To that is added its own growth. There is thus an inexhaustible supply of human population without a proportionate increase in the number of reasonably priced dwelling units. There are just two alternatives open to Government: either stop the influx of population by creating powerful and effective counter magnets in the form of satellite towns around the metropolitan region or provide an adequate number of plots of land in approved colonies at reasonable prices. The first alternative is mentioned and spelt out at some length in the Master Plan. However, the philosophers who wrote the book having departed and the actual implementation being weak and inadequate, this book is in great danger of being regarded as a book of fairy tales to be read out to children sitting in chimney corners during winter nights. The way in which the second alternative has been implemented reminds me of those men of Gotham:

Three wise men of Gotham
Went to sea in a bowl.
If the bowl had been stronger
My tale would be longer.

THE LOOPHOLES IN THE LAW

I have made an attempt in the preceding paragraphs to show how attractive it is to go in for unauthorised construction. But an awful lot of things in human life are attractive. If all attractive things were also attainable and possible, life would be pretty different. I am sure a whole lot of romantic poetry would have remained unwritten in that event. In the case of unauthorised construction, however, what is attractive is also attainable—thanks to the loopholes in the law. If one morning, while going to the Town Hall, I discover some people putting up what is obviously an unauthorised building, I can be little more than a pathetic spectator. I am required under Section 343 read with Section 344 of the Delhi Municipal Corporation Act 1957, as amended from time to time, first to give the builder a 3 days' "Show-Cause" notice. If I find the builder's reply to be unsatisfactory, I must give him another notice specifying a time-limit of not less than five days within which he must demolish the structure. If he does not comply with the requirements of the second notice, I can ask my demolition gang to pull down the building. But if the builder is not cooperative enough and has locked the house in the meantime, I must serve on him a "lock-breaking" notice of at least twenty four hours' duration. It is only the most resourceless builder who will, during all this time, not bestir himself and obtain a stay order. Formerly, the law considered a twenty four hours' notice followed by a six-hour compliance notice quite sufficient for the purpose. The Corporation suggested an amendment to

arm its officers with greater and swifter powers. Parliament, on the other hand, increased the time limit to a minimum of five days before a structure could be demolished after a show cause notice. The period of nervous helplessness of the Corporation staff has thus been increased substantially while the builder goes on blithely with his construction. If there is a long week-end which we get on the second Saturday of every month, there are experts in the capital who undertake to put up a modest two-room semi-permanent house before the office opens on Monday. During the period of immunity granted by the Law, the builder has not lost time but has in the meantime made all attempts to win over the official and the influential members and "social workers" of the locality. If he fails in these attempts, he tries to secure an injunction from the court of law. It is only when the injunction is not forthcoming that the house is at last ready for demolition.

I know what you are now wanting to tell me. You must be wanting to draw my attention to the provisions of Section 344 of the Delhi Municipal Corporation Act 1957, which empowers the Commissioner to require the person at whose instance the building or the work has been commenced or is being carried on to stop it forthwith. If this order is not complied with, he may require any police officer to remove such person and assistants and workmen from the premises within such time as may be specified in the requisition and such police officer, the law goes on to say, "shall comply with the requisition accordingly". The section is admirably worded and you would think that you have rendered me speechless. The Police *shall* comply with the directions given. What more is needed? But the point is that the police probably have their difficulties on which I am hardly in a position to dwell in the course of this paper. There may be a shortage of staff or of transport or perhaps some other administrative handicap may intervene which I cannot adequately visualise. Whatever be the reason, the fact is that the directions of the law are infringed as a rule and compliance of the legal requirement is exceptional. Is there any remedy open to the Commissioner against the violation of mandatory requirements on the part of the police? The requirement is not justiciable and, in the absence of any provision as to the consequences of such violation, is no more than a moral precept which everybody admires but very few observe. Even if there were a penalty prescribed for such violation, the Corporation staff will be extremely reluctant to take action against their brother officers. It is another matter that recently an Executive Engineer of the Municipal Corporation of Delhi was prosecuted by the police for using the paver-finisher recently acquired by us for laying a dense carpet on a certain road. This was done in spite of Section 477 of the Delhi Municipal Corporation Act which protects the staff of the Corporation from such prosecution. The Commissioner wrote a strong letter of protest and I am sure something will be done about the matter although there is no evidence so far of anything concrete having been done in pursuance of this letter.

I seem to have digressed, however. The point is: what does the Commissioner do if the police, for some reasons, do not comply with his requisition? He can only send letters of protest which he often does and then pray hopefully. It is true that a circular was issued by the Inspector General of Police some time ago calling upon Station House Officers to comply with the requirements of Section 344 of the Delhi Municipal Corporation Act. The outcome of these circulars has yet to manifest itself in concrete action. In the meantime unauthorised structures increase at the rate of sixteen per day.

THE WAVERING POLICY

I should now like to mention an important factor which aggravates the problem, namely, the wavering policy of the administration and the ever-shifting crucial date up to which demolition is stayed on an *ad hoc* basis. At one time it was decided that the demolition of structures constructed up to 1962 should be kept in abeyance. This date was subsequently shifted to 1967. People naturally get the impression that the administration did not mean business. The word went round that if you put up a building and are brazen about it, on some future date your action will be approved and regularised. To a great extent the history of Delhi is a story of law-breaking and its subsequent ratification. For instance, scores of unauthorised colonies have been regularised. Similarly, buildings put up irregularly are tolerated. Another illogicability of the situation was that structures were demolished in a chronological order. Since there is always a tremendous backlog of old cases awaiting demolition, people thought that if they put up a building now, it might take God's good time for it to be pulled down. It may also happen that by the time the turn for demolition comes, the policy of the administration might undergo change and the building in question might be tolerated. It was decided in November 1968 that structures which are seen under construction should be given the highest priority for purposes of demolition. This has had a salutary effect but the backlog persists and has even increased.

DECENTRALISATION—A BOON FOR SOME

An important reason for the inability of the administration to contain and attack the spate of unauthorised building activity is the evasion of responsibility at the zonal level. While on the one hand we all swear by decentralisation and in meetings and conferences, the tongue is never tired of lending itself words on the subject, I have noticed, on the other, that there is a remarkable degree of resistance to the idea of squarely shouldering responsibility from officers entrusted with this work in the different zones of the Corporation. The Zonal Assistant Commissioner, for instance, writes the Character Roll of the Zonal Engineer. He has all the powers he needs. The entire staff in the zone is under his administrative control. Yet he shirks responsibility and is only

too eager to blame or pass on the buck to some one else. Before the decentralisation of work amidst the different zones, the rate of buildings demolished per squad per day was 5; it has dwindled now to a mere 2. It has been clearly laid down that the Zonal Assistant Commissioner must inspect a certain percentage of cases. The direction has been uniformly violated.

THE WAY OUT

What is then the way out? The remedies suggest themselves and are implicit in the defects I have enumerated. First, the law must be suitably amended so as to make it possible to demolish an unauthorised structure much more expeditiously. Second, there must be something to compel the police to render all assistance to the Commissioner when called upon to do so. There must be a suitable provision in the law to leave no alternative to the police but to comply with the requisition of the Commissioner under Section 344(2) of the D.M.C. Act 1957. Third, the squad and the staff engaged on the work of checking and demolishing unauthorised structures should be adequately increased. Fourth, the zonal staff more particularly the Zonal Assistant Commissioner must be held squarely answerable for what happens in his jurisdiction. The C.R. entry of the Zonal Assistant Commissioner must make a specific mention of his work in this sphere, the number of inspections carried out, the extent of demolition and the disposal of arrears. The policy of the administration must be firm and unambiguous and there must be no paths left for the belief, that it can be easily varied. Lastly, it is of paramount importance that we make land available at reasonable prices in far greater abundance to the vast generality of people.

I have come now to the end of my endeavour. Even today, as we are busy deliberating, sixteen unauthorised buildings must have come up in the town. There must have been the requisite turnover of Mughal bricks; the fire lit up near new buildings must have turned them old; premises locked from outside must have seen walls and windows and ceilings rise and where there was nothing, storeys must have come up to stately heights. This is an industry which knows no strikes and lock-outs; shortage of raw material does not turn its shares bearish. No administrative hurdles impede its efficient course. Like Tennyson's brook it goes on for ever. Its spoils are shared by land pirates while its price is paid by the town in terms of beauty and comeliness. Where we dreamed there should be a park, a festering slum is born; the plan of a school yields place to a heap of rubbish and where our children were to swing or play ball, pigs and dogs and ghoulish creatures may abound. The selfish and unscrupulous share the spoils of a large-scale loot while the poor suffer and shrivel up in hovels that stink. In the meantime, we sit pretty and call the Friday good as T.S. Eliot puts it. We must, therefore, all of us put our shoulders to the wheel and I think it would have been a major gain if we find that today's debate and deliberations have made us sit up and think.

6

Law and Urban Land*

Urban land has been often labelled by writers rather picturesquely as a "concrete jungle" or a "human zoo".

Imagine a piece of land twenty miles long and twenty miles wide. Picture it wild, inhabited by animals, small and large. Now visualize a compact group of sixty human beings camping in the middle of this territory. Try to see yourself sitting there, as a member of this tiny tribe, with the landscape, your landscape, spreading out around you farther than you can see. No one apart from your tribe uses this vast space. It is your exclusive home-range, your tribal hunting ground. Ever so often the men in your group set off in pursuit of prey. The women gather fruit and berries. The children play noisily around the camp site, imitating the hunting techniques of their fathers. If the tribe is successful and swells in size, a splinter group will set off to colonize a new territory. Little by little the species will spread.

Imagine a piece of land twenty miles long and twenty miles wide. Picture it civilized, inhabited by machines and buildings. Now visualize a compact group of six million human beings camping in the middle of this territory. See yourself sitting there, with the complexity of the huge city spreading out all around you, farther than you can see.¹ In the second scene there are a hundred thousand individuals for every one in the first scene. The space has remained the same, only the land has become urban in a mere few thousand years although the man has remained, biologically speaking, the same, not for a few centuries but for a million hard years. This land, in other words, has gone through a process of urbanization.

URBAN PROSPECTS

Urbanizations is a world wide phenomenon. In 1850 there were only four cities in this world which had a population of one million or more. By 1900 this number became nineteen. But by 1960 there were 141 and today the world's urban population increases at a rate of 6.5 per cent per year.² The projections made by United Nations' demographers indicate that in a period of 35 years, from 1971 to 2006, the world population will double

* Background paper prepared for the Seminar on "Law and Urban Land" held at the Indian Institute of Public Administration, New Delhi, during January 28-29, 1977.

¹Desmond Morris, *The Human Zoo*, Gorge Books, Transworld Publishers Ltd.

²Alvin Toffler, *Future Shock*, Pan Books Ltd., London, 1970.

from 3.7 billion to 7.4 billion.³ As can be seen from Table 6.1 the urban population, in cities of over 20,000, is anticipated to be in excess of 3 billion and the aggregate population of large cities will exceed 2 billion.

Table 6.1

PROJECTED PERCENTAGE OF WORLD POPULATION AND NUMBER OF URBAN RESIDENTS FOR DESIGNATED DATES

<i>Date</i>	<i>Per cent Urban (over 20,000)</i>	<i>Number of Urban Residents (in billions)</i>	<i>Percentage of large cities (over 100,000)</i>	<i>Number of Residents in large cities (in billions)</i>
1970	39	1.4	24	0.8
1975	42	1.7	26	1.0
1985	49	2.3	32	1.5
2000	61	3.9	42	2.7

SOURCE: Kingsley Davis, *World Urbanization 1950-70*, Vol. II, 1972.

Yet another way of viewing future urban prospects would be to examine projections that indicate the number of years in which the population in a particular country will double. Keeping the rate of increase as in 1972, the projections indicate a spectrum, at or near one end of which are Sweden and U.K. with 174 and 139 years and at or near the other end are India, Egypt and Mexico with 28, 25 and 21 years respectively. In other words India would double its 1972 size in the year 2000.⁴

According to 1971 census, India's urban population was 109.1 million forming 19.9 per cent of the country's total population. Looking at the figures given in Table II, it would be seen that there has been a more than four-fold increase in a span of seven decades ending 1971 in the urban population of India. The pace of urbanization no doubt slowed down during 1951-61 and after but it would be a little premature to believe that it would not accelerate in the coming decades. According to Davis the average population increase of five major Indian cities, viz., Calcutta, Bombay, Hyderabad, Delhi and Bangalore, declined from 52 per cent between 1941-51 to 33 per cent between 1951 and 1961.⁵ These figures, however, have been challenged by Jakobson and Prakash

³United Nations, *Demographic Year Book* (1971).

⁴Noel P. Gist and Sylvia Fleis Fava, *Urban Society*, Thomas Y. Crowell Co., New York.

⁵Kingsley Davis, *Urbanization in India: Past and Future* in Roy Turner edition.

who state that a major change in the census definition of "urban" for the 1951-61 decade may have meant a higher growth rate for this decade and for the preceding one.⁶ For Delhi alone the percentage growth rate in 1941-51 was 107 (mainly due to partition of the country) and it dropped down to 63 per cent in 1951-61 decade. Similarly, Bangalore declined from 90 per cent to 29 per cent. This decline continued through the decade preceding 1970, when the average percentage growth rate of the five cities taken together, declined to 24 per cent. This decline in rate of growth has been experienced by many other cities that underwent spectacular growth during World War II. This certainly does not indicate a numerical decrease.⁷ As can be seen from Table 6.2 the urban population in India crossed the 100 million mark during 1971 census and reached a figure of 109.1 million constituting nearly 20 per cent of the total population of 547.8 million. Similarly the number of urban places also grew to a figure of 2921.

Table 6.2
TRENDS OF URBAN POPULATION IN INDIA

	1901	1911	1921	1931	1941	1951	1961	1971
Total Population (Millions)	238.4	252.1	251.3	279.0	318.7	361.1	439.2	547.8
Urban Population (Millions)	25.8	25.9	28.1	33.5	44.2	62.9	78.9	109.1
Urban as Percentage of total	10.8	10.3	11.2	12.0	13.9	17.3	18.0	19.9
Growth Index (1901=100)	100.0	100.4	108.6	129.4	170.8	241.6	305.4	422.9
Decennial Growth	—	0.35	8.27	19.12	31.97	41.43	26.41	37.83
Number of Urban Places	1917	1909	2047	2219	2424	3060	2700	2921
Growth Index (1901=100)	100	100.4	106.8	115.8	126.5	159.6	140.9	152.4

URBAN PROBLEMS

Two basic factors responsible for this urban population growth are: the growth of urban economy and movement of population from villages to larger cities. Unfortunately, data regarding per capita income are not available for Indian cities and towns to indicate their economic level. It is, however,

⁶Leo Jakobson and Ved Prakash, "Urbanization and Regional Planning in India", *Urban Affairs*, 2 (March 1967).

⁷United Nations, *Demographic Year Book* (1971).

noticed that whereas 23.98 per cent of the class I cities have a highly diversified occupational pattern, the corresponding percentage for class V and Class VI towns is as low as 13.80 and 5.50 per cent respectively.⁸ This imbalance in the occupational pattern is one of the main weaknesses in India's urbanization. The spread of urbanization is also not even. Whereas population of Class I cities keeps increasing, the smaller towns of less than 20,000 category classified as class IV, V and VI have proved to be unattractive. As can be seen from Table 6.3 of cities with population of 100,000 or more in India and USA, more than 50 per cent of urban population stays in cities having population of more than 100,000. Also the number of these cities in India grew from 76 in 1950-51 to 142 in 1970-71. As compared to this, the number of American cities of similar magnitude increased from 106 to 156 during the same period.

Table 6.3

CITIES WITH POPULATION OF 100,000 OR MORE IN INDIA AND USA

Year	No. of Cities 100,000+		Their Population (Millions)		Percent of Total Urban Population	
	USA	India	USA	India	USA	India
1950						
1951	106	76	44.3	23.7	45.9	41.8
1960						
1961	132	113	51.0	38.2	40.8	48.4
1970						
1971	156	142	56.4	57.0	37.7	52.4

In most of our cities and towns, urban services and amenities, living conditions and the environment are already woefully deficient. To make the matters more difficult, these cities face the problem of additional influx of population every year. The thread-bare infrastructure of services existing in these cities gets over-stressed and is often torn to pieces. The foremost problem these urban areas face is that of shortage in housing and resulting squatting on public lands, encroachments, uncontrolled settlements and increased densities in built-up areas. Housing shortage in urban areas was about 2.8 million units in 1951 which rose to 9.3 million units in 1961 and over 12 million

⁸Ashok Mitra, *Functional Classification of India's Towns*.

units in 1971. The estimated shortage of housing units in 1980 is placed at 25 million. The immediate impact of this is felt on services like inadequate or near nonexistent water supply and sewerage, limited road network and open spaces, shortage of schools, hospitals, public places, community facilities and poor sanitation. Those in authority are faced with a twin problem of: (a) not permitting haphazard growth, and (b) making available extra facilities to the growing population and that too at a speed which should be commensurate with the rate of increase in urban population. The city managers and the planners are at once surrounded by a multitude of problems: financial, administrative, technical and legal. In this paper we shall restrict our comments to the "legal tools" that are available at present in our country to help our planners to solve and save the situation enumerated above on urban land.

PROBLEMS—LEGAL AND ADMINISTRATIVE

The foremost requirement before the planner will be obviously that of land. The city is normally a municipality or a corporation with limited boundaries and infrastructure which due to expansion of population has also to expand both its boundaries and infrastructure. Considering that it has a will and means to do it, it is faced with difficult administrative, and legal problems. In order to bring out their importance, I can do no better than quote Justice Wanchoo, former Chief Justice of India:

"These (administrative and legal problems) require an administrative structure which would carry through the schemes of urbanisation to meet the expansion of population. We have in this connection in many States administrative bodies, called Improvement Trusts and others of the same kind. These bodies have to be created by laws passed by the States and have to be armed with legal authority to deal with problems arising out of planning. They naturally have to interfere with the property rights of individuals which have the protection of Articles 19 and 31 of the Constitution. Laws have to be enacted which necessarily interfere with the property rights of individuals. These laws have naturally to pass the test provided by Article 19(5), of the Constitution which lays down that nothing in Article 19(1)(f) of the Constitution, shall prevent the State from making any law imposing reasonable restrictions on the exercise of any of the rights conferred by that clause in the interests of the general public. Many such laws when they are passed are attacked by individual property owners on the ground that they are unconstitutional and impose unreasonable restrictions on the exercise of the citizen's right to acquire, hold and dispose of property. These legal hurdles have to be overcome before any town planning scheme can get under way. But even after the legal hurdles have been overcome and the laws passed by the State are upheld as constitutional, the great problem of administering these complex laws which strike a delicate balance between the right of the

individual and the necessities of public good has to be undertaken. This requires a body of efficient personnel in public service who are experienced in the field of town planning to carry out schemes that are eventually approved. This also requires a degree of integrity and devotion to duty on the part of public servants who have to administer these schemes in order that results may be achieved in as short a time as possible. It further requires on the part of the citizens of this country some sense of sacrifice of their individual right in the interest of common good, for it has not been unknown that one cantankerous citizen standing on the letter of the law and defending his right to property irrespective of the need for the public good can hold up beneficial schemes for long periods of time through resort to law courts. If the trend of movement from villages to cities continues, as it is expected to continue, and if the stream of such movement becomes larger in volume than at present, as it is expected to be, all these problems will be accentuated further. That will require an amount of concerted effort on behalf of all from the Central Government down to smallest municipality, from the topmost public servant to the lowest in the department dealing with town planning and will also require a sense of public duty and public good in the citizens of this country so that they may be able to subordinate their individual interests to the common good to some extent at least."⁹

From amongst the existing legislations which can be utilised for clearance, development and control of urban land indicated below, some of the more important are discussed in detail, in the forthcoming paragraphs.

1. Land Acquisition Act
2. Slum Clearance Acts
3. Municipal Acts
4. Improvement Trust Acts
5. Town Planning and Development Acts
6. Taxation Laws
7. Urban Land Ceiling Act
8. Urban Arts Commission Act
9. Rent Control Legislation
10. Water and Air Pollution Acts
11. Regulations such as:
 - (a) Zoning Regulations including Densities
 - (b) Land use Laws
 - (c) Laws for Promotion of Public Health Safety and Welfare
 - (d) Industries (Development and the use of the Regulation) Act
 - (e) Building Regulations, etc.

⁹Justice K.N. Wanchoo, Former Chief Justice of India, in his inaugural address at the Seminar on "Law and Urbanization in India", sponsored by the Indian Law Institute, December 1967, at Allahabad.

LAW OF LAND ACQUISITION

For implementation of any urban development programme, availability of land and its control are essential prerequisites. Controls like zoning regulations, subdivision rules, building bye-laws and authority to approve layouts are means of directing urban growth. These negative restrictions on the use and development of land cannot replace the necessity of acquisition of land. These techniques have been borrowed from more advanced countries and by themselves are not effective for solving the problems of developing countries. Uncontrolled settlements and squatting on public lands pock-mark the urban landscape and attempts to control their growth are doomed to failure. Acquisition of land and creating an adequate stock of urban land would be essential not only for future growth but also for a large number of public use and clearance programmes. One of the most important legal tools available for this purpose is the Land Acquisition Act, 1894. The procedure prescribed under the Act is not only complicated but also leads to subsequent litigations and delays. It is incumbent to issue a notice under Section 4 followed by another declaration under Section 6 that the land is required for a public purpose. Yet another notice under Section 9 is required to be given for filing claims for compensation. At all or any of these three stages objections can be raised resulting in delays. This procedure can perhaps be revised and shortened without denying the right to the owner to be heard. Again, the transfer of land takes place after final determination of compensation which can take years to finalise. Delay could be reduced at this stage also by making suitable provision that the title of land could be transferred in favour of government subject to final settlement on compensation and without prejudice to the right of owner to agitate the question of quantum of compensation. The Land Acquisition (Amendment and Validation) Act 1967 has tried to overcome some of the difficulties and now enables to freeze the prices on a particular date by issuing a notification under Section 4 provided the acquisition in pieces or as a whole is made within three years. Under Section 23, payment is required to be made as per market value of the land as it stood on the day on which Section 4 notification was issued plus an amount of 15 per cent of the market value in consideration of the compulsory nature of acquisition. There is no doubt that the Act needs revision. Thacker Committee appointed by the Housing Ministers Conference also criticised the Act and even the Third Five Year Plan refers to the lengthy and time consuming procedure for acquisition of land for slum areas. The quantum of compensation provided in the Act is yet another factor which impedes urban development as large sums of money are required to acquire land at its market value. Under the Twenty-Fifth amendment of the Constitution the expression "compensation" in Article 31 was substituted by the term "amount". It also added a new clause, *viz.*, Article 31C giving unrestricted powers to Parliament to give effect to the Directive Principles of State Policy contained in Article 39 of the Constitution.

In spite of this the land acquisition awards continue to be on the basis of market price as it stood on the date of Section 4 notification. The Land Acquisition Act, 1894 being a pre-constitutional piece of legislation is not required to satisfy the requirements of Constitutional provisions. The situation has been summed up by Balachandran in his paper on "Land Acquisition and Implementation of Development Plans" in the following words: "It is unfortunate that the enthusiasm with which the historic Twenty-Fifth Amendment was passed through the Parliament, has faded away soon after the Amendments came into effect. If follow-up legislations consequent to the Amendment are not enacted, the blame is not on the judiciary but on the legislature. When the Amendment enables the state to pay less than the market value by way of compensation for compulsory acquisition of property where it cannot afford to pay full market value, there is no reason for not carrying out the required amendment in the acquisition laws. It is high time that suitable amendments are made in the various laws dealing with the acquisition of property starting from the original Land Acquisition Act of 1894 and covering up the Development Acts, for the speedy implementation of the plans.

"Yet another point: The existing procedure for acquisition under the Land Acquisition Act is too dilatory and time-consuming and does not suit the requirements of the development plans. Some of the Development Acts, as has already been pointed out, have made provisions for the constitution of tribunals and their decisions in matters of acquisition are made final. The Supreme Court in *Sarwan Singh's* case has upheld this provision and held that 'the legislature by making the order of the tribunal final, seeks to avoid delay in the course of litigation to defeat the purposes of scheme framed under the (Town Improvement) Act.'

"One of the main advantages of tribunals is that they are quicker in settling disputes than the ordinary courts and they are in a better position to avail of the special knowledge of experts in the field. It is, therefore, suggested that necessary amendments may be made in the Development Acts so as to exclude the jurisdiction of the courts in matters of acquisition by creating tribunals comprising of efficient experts in the area."¹⁰

TOWN PLANNING LEGISLATIONS

The law is now well settled that the State legislature has got the power to enact town planning legislations. It is also held that the central legislature also has the authority under the Concurrent List to enact town planning legislations.¹¹ The Legislations dealing with planning and development may be

¹⁰M.K. Balachandran, "Land Acquisition and Implementation of Development Plans", *Nagarloka*, July-Sept. 1975.

¹¹M.K. Balachandran in "Law in Urban Planning".

broadly classified under three different heads:

1. Municipal Acts,
2. Improvement Trust Acts, and
3. Town Planning and Development Acts.

Municipal Acts

The municipal Acts contain many provisions controlling development of land and building activity, licensing of trades and factories, prohibiting public nuisance and pollution, demolition of ruinous and dangerous structures, construction of water, sewerage and public drains, etc. These provisions are limited to the jurisdictions of municipalities and cannot apply to areas outside their jurisdiction. Many times municipalities are blamed for not implementing these effectively. Examination of procedures involved and possible penalties that can be levied will bring out the reason for their non-effectiveness. To illustrate this point I will take only one example of the provisions of law to check unauthorised structures and quote from a paper on "The Problems of Unauthorised Construction in Delhi".

"If one morning, while going to the Town Hall, I discovered some people putting up what is obviously an unauthorised building, I can be little more than a pathetic spectator. I am required under Section 343 read with Section 344 of the Delhi Municipal Corporation Act 1957, as amended from time to time, first to give the builder a 3 days 'show-cause' notice. If I find the builder's reply to be unsatisfactory, I must give him another notice specifying a time-limit of not less than five days within which he must demolish the structure. If he does not comply with the requirements of the second notice, I can ask my demolition gang to pull down the building. But if the builder is not cooperative enough and has locked the house in the meantime, I must serve on him a 'lock-breaking' notice of at least twenty-four hours' duration. It is only the most resourceless builder who will, during all this time, not bestir himself and obtain a stay order. Formerly the law considered a twenty-four hours' notice followed by a six-hour compliance notice quite sufficient for the purpose. The Corporation suggested an amendment to arm its officers with greater and swifter powers. Parliament, on the other hand, increased the time limit to a minimum of five days before a structure could be demolished after a show cause notice. The period of nervous helplessness of the Corporation staff has thus been increased substantially while the builder goes on blithely with his construction. If there is a long week-end which we get on the second Saturday of every month, there are experts in the capital who undertake to put up a modest two-room semi-permanent house before the office opens on Monday. During the period of immunity granted by the law, the builder has not lost time but has in the meantime made all attempts to win over the official and the influential members and social workers of the

locality. If he fails in these attempts, he tries to secure an injunction from court of law. It is only when the injunction is not forthcoming that the house is at last ready for demolition."¹² The provisions and penalties governing development and selling of virgin land are equally ineffective.

Improvement Trust Acts

The inadequacy of municipal laws as applied to urban development was felt quite early in our country and it was as far back as 1898 that attempts at town development came in the form of Town Improvement Act of Bombay. It was followed up in 1911 in Calcutta and in 1919 in U.P. and thereafter a number of enactments in other parts of the country came up. Unlike municipal Acts, the jurisdiction of Improvement Authorities is not limited to municipal boundaries of an existing city but can be extended to include peripheral areas by preparing a town expansion and Improvement Schemes indicating use and re-use of land including land acquisition, redevelopment and disposal. Under these Acts it was not necessary to prepare a Master Plan for the city or region. Any action programme for specific areas could be formulated and implemented. These Acts as such suffered from a main drawback, viz., they did not take an overall picture of the city or regions of development. Efforts were then made to combine Town Planning and Improvement Trusts under one legislation as in Bihar, Orissa and Rajasthan. Separate Town Planning legislations were also enacted as in Bombay in 1951 and in Madras in 1920. The one in Bombay was revised in 1954 and the same has been replaced by Maharashtra Regional and Town Planning Act, 1966.

Model Town and Country Planning Law

A model Town and Country Planning law was approved by the Second Conference of State Ministers on Town & Country Planning held in 1962. Many States revised their existing town planning legislations and enacted comprehensive legislations for urban planning and development. Kutty in his paper on "Administrative Vacuum in Indian Planning Law" points out that the Model Law puts great emphasis on legislation for the enforcement of control on land use and development rather than on promotion of economic growth. More important factor is complete lack of any provision for setting up of machinery for the implementation of urban and regional plans.¹³ Anatole A. Solow, Associate Professor of Urban and Regional Planning, University of Pittsburg, in his contribution to the symposium on "Urbanization in Developing Countries" held in December 1967 at Noordwijk, Netherlands

¹²For an elaboration of this issue see chapter on "Problems of Unauthorised Construction in Delhi".

¹³M.G. Kutty in "Administrative Vacuum in Indian Planning Law", 15th Annual Seminar, Institute of Town Planners, India, 1966.

pointed out that in many countries it was not a lack of legislation in this field but rather that a great many laws were unrealistically designed and could not be implemented. The weakest point of Model Town Planning Law and Town Planning Legislations has been to treat planning and implementation as two separate entities and therefore entrusted to different authorities. The planners feel diffident to implement the plans created by them mainly perhaps because they lack the training and practical experience in that context. Besides, it also gives an opportunity to pass on the criticism elsewhere if the implementation authorities are different. This has the tendency to make planning dilatory and unreal. On the other hand even implementation authorities work in a fragmented and disjointed manner since the responsibilities get divided amongst municipal body, Improvement Trust or Development Authority, Water, Sewerage and Electric Supply Undertakings, Housing Board, Transport Corporation, etc.

TAXATION LAWS

Generally, the municipal bodies in our country have levied taxes on property, octroi, terminal and toll tax, taxes on trades, animals and vehicles (other than motor vehicles). The other two levies which the local authorities often mention but fail to realise are "betterment charges" and "unearned increment tax on land". Betterment charge or levy is a tax on "the increase in urban land values due to execution of improvement works". Delhi and Madras in spite of repeated efforts have not been able to levy and recover the betterment levy, mainly because it is difficult to determine and establish the quantum of increase in the value of urban land only on account of improvement works like, laying a sewer, providing a parking lot, etc. Regarding unearned increment tax on land, it may be mentioned that the third five year plan, with reference to housing, pronounced the objective of "control of urban land values through public acquisition of land and appropriate fiscal policies". The idea was to mop up unearned profits made by land owners arising out of speculation in land. The Committee of Ministers constituted in 1965 by the Central Council of Local Self-Government on Augmentation of Financial Resources of Urban Local Bodies observed: "In all advanced countries a system of progressive taxation for mopping up such unearned increments in property values is already in existence. For example in U.S.A., an annual tax of one thousand dollars is levied on every acre of land valued at 50,000 dollars. The owner has to pay another thousand dollars per year if the land value doubles, *i.e.*, about 2 per cent of the increase in capital value. In U.K., increment value duty on site value was collected as early as in 1910". The committee accordingly approved the following suggestion that "the best way to make an impact on rising urban land prices—is to levy an annual tax on such unearned increments... for determining the annual tax liability, periodical assessment of urban land and properties will have to be undertaken and

the tax liability determined for the period intervening between two assessments."

THE URBAN LAND (CEILING AND REGULATION) ACT, 1976

The purpose of this Act as given in the Statement of Objects and Reasons reads as under:

"There has been a demand for imposing a ceiling on urban property also, especially after the imposition of a ceiling on agricultural lands by the State Governments. With growth of population and increasing urbanization, a need for orderly development of urban areas has also been felt. It is, therefore, considered necessary to take measures for exercising social control over the scarce resource of urban land with a view to ensuring its equitable distribution amongst the various sections of society and also avoiding speculative transactions relating to land in urban agglomerations.

The Bill is intended to achieve the following objectives:

- (i) to prevent concentration of urban property in the hands of a few persons and speculation and profiteering therein;
- (ii) to bring about socialization of urban land in urban agglomerations to subserve the common good by ensuring its equitable distribution;
- (iii) to discourage construction of luxury housing leading to conspicuous consumption of scarce building materials and to ensure the equitable utilization of such materials; and
- (iv) to secure orderly urbanization."¹⁴

The Act lays down four categories of urban agglomerations. Class A urban agglomeration has a ceiling limit of 500 sq. metres, Class B 1000 sq. metres, Class C 1500 sq. metres and Class D urban agglomeration has a ceiling limit of 2000 sq. metres. Returns of excess urban land are to be filed within prescribed periods under Rule 3 which in turn has a bearing on Sections 6, 19 and 20 of the Act. The State Governments have powers to exempt any vacant land in public interest and also in cases where such exemption is considered to be necessary to avoid undue hardship to any person. The Bill thus provides a ceiling on both ownership and possession of vacant land in urban agglomerations according to categories mentioned above. It also gives powers to State Governments to acquire vacant land on payment of an amount equal to eight and one-third times the net average annual income actually derived during the period of preceding five consecutive years or in a case where no income is derived from such vacant land, an amount calculated at a rate not exceeding Rs. 10 per sq. meter in cases of categories A & B and at a rate not exceeding Rs. 5 per sq. meter in cases of categories C & D. The payment of such

¹⁴*Gazette of India, Extraordinary, Pt. II, Sec. 2, dated the 28th January, 1976.*

amounts can be made in cash and in bonds. It also regulates the transfer of vacant land within the ceiling limits, transfer of urban or urbanizable land with any building (whether constructed before or after the commencement of the proposed legislation) for a period of 10 years from the commencement of the legislation or the construction of the building, whichever is later and also restricts the plinth areas for construction of future residential buildings to be not more than 300 sq. meters in respect of urban agglomeration of categories A & B and not more than 500 sq. meters for categories C & D. The Act also lays down a provision of constituting Urban Land Tribunals for entertaining appeals if any person is aggrieved by an order of the competent authority. The second appeal, subject to the provisions of the Code of Civil Procedure, 1908, shall however lie to the High Court for the decision of the Tribunal.

It will be seen from above that the Urban Land Ceiling Act has taken adequate care to see that not only the long drawn delays are avoided but even the quantum and mode of payment is quite convenient. It truly exercises social control over urban land. It has now to be ensured that appropriate machinery is set up to see to equitable distribution amongst various sections of society and stop speculative transactions. The utility of the Act in Urban Development Programmes will however be limited to the extent of definition of 'vacant land' as provided in the Act. Since this definition excludes land on which construction of building is not permissible under the building regulations in force in the area, the land earmarked for important urban infrastructure like roads, water supply and sewage treatment plants, bus depots, parking lots, open spaces, parks, playground and master plan greens will have to be acquired under different laws and Acts. It will also affect the existing densities in built up areas and cause some congestion and strain on already overloaded services. But the object to be achieved is so laudable that these factors are only small pin-pricks which can be put up with and in some cases even remedied. A few states have already taken steps to implement even the complementary measures of taxation. West Bengal has enacted the West Bengal Urban Land Taxation Act 1976 which provides for levy of urban land tax, development charges, conversion charges and prohibiting conversion of agricultural land to non-agricultural use.

The Act raises many interesting issues foremost being the provisions of Section 20(1) for permitting to hold vacant land in excess of the ceiling limit for construction of dwelling units having an area of not more than 80 sq. metres for weaker sections of society. As far as defining weaker section of society is concerned, the Finance Minister in his proposals for tax relief announced on March 15, 1976 provided the indication as can be seen from the extract reproduced below:

"There is acute shortage of housing, particularly of the kind required by the poorer sections of the community. House construction is entitled to be treated as a major industry in its own right. Apart from fulfilling the basic

human need for shelter, it generates considerable employment, both direct and indirect. Increased activity in this sector will also improve the demand for materials like cement, steel and coal for making bricks. To attract more resources for this neglected but essential purpose, I propose to exempt new dwelling units put up after 1st April, 1976 with a plinth area up to 80 sq. metres from wealth-tax for a period of five years. Initial depreciation allowance of 20 per cent will hereafter be available in respect of houses constructed by employers for use as residence of low-paid employees having annual salary income up to Rs. 10,000 instead of Rs. 7,500 as at present."¹⁵

Besides this every State will have to take its own decisions on issues like ceiling cost, plinth area rates, percentage return, monthly rental, etc. Since the conditions would vary from State to State, it would be a difficult task to evolve uniform guidelines for this purpose. As an important objective of the Act is to step up the housing stock in the country, it would be desirable to prescribe terms and conditions which should be attractive enough to encourage private housing activity on such lands, unless the Government has a more vital use for it.

There was some criticism in the beginning that due to the Act the building activity had come to a standstill. This impression was perhaps not fully justified. There might have been a pause in the beginning, but the Government acted swiftly and by holding high level meetings and issuing guidelines and clarifications, ensured that all construction and development proposals not affected by the Act were not held up.

Utilisation of small pieces of land left over from plots marginally above the ceiling limits prescribed, is yet another teaser. Fear is also expressed that in cities where large tracts of land situated at or near the periphery indicated as agricultural land in the master plans for those cities, agricultural produce might suffer since such land has become urban or urbanisable under the Act. Holders of such land could be encouraged to utilise the same till such time the land is taken over for urban development. However, it would be desirable to step up the programme of developing barren lands and make the same fit for agricultural purpose. A quick decision is also needed as to which cultivation/activity should be excluded from the definition of 'agriculture'. Poultry, dairy and stud farms, mango groves and other fruit bearing trees if excluded from this definition can cause scarcity and step-up prices of these commodities.

BUILDING BYE-LAWS

The existing building bye-laws in most of the towns are framed on the concept of "garden cities". In view of the objectives indicated in the Urban Land Ceiling Act, these norms will have to undergo changes. Some of us,

¹⁵Extract from proposals of Hon. Minister for Finance, Government of India, for tax relief announced on March 15, 1976.

who have seen how difficult it is to implement and maintain the concept of a "garden city" in fast growing urban areas, find it difficult to change and adjust to this wilful lowering of standards. But the attitudes have to change. We also consume lot of space in stairs, passages, kitchens, etc., and now that there are plinth area restrictions, it would be desirable to amend building bye-laws keeping in view the whole question of preventing luxury constructions and ensuring modest but comfortable homes and equitable distribution of land. However, multi-storeyed buildings and group housing schemes will need a different approach and if they are allowed to retain only a small area of "land appurtenant" around these, the environment is bound to deteriorate.

URBAN ART COMMISSION

Even a properly planned and developed city can be ruined aesthetically if proper control over street furniture, hoardings, elevations of main structures, etc., is overlooked. With a view to control aesthetic quality of urban environment it is essential to establish Urban Art Commissions. In U.K. and U.S.A., the Commissions are called Fine Art Commissions. Such titles, in the beginning, had confused and misled people to think that they were only meant for painting, sculpture and other similar fine Arts. To avoid such doubts, the word urban was considered essential. For the first time such a Commission has been established in our country in Delhi by the Government of India under an Act of Parliament, namely, the Delhi Urban Art Commission Act, 1973 (1 of 1974). The Act came into force with effect from 1st May, 1974. Following are the objectives of the Commission:

1. To promote those qualities in the environment which bring value to the community.
2. To foster the attractiveness and functional utility of the community as a place to live and work.
3. To preserve the character and quality of our heritage by maintaining the integrity of those areas which have a discernible character or are of special historical significance.
4. To protect certain public investments in the area.
5. To prevent bad design and encourage good.
6. To raise the level of community expectations for the quality of its environment.¹⁶

The main responsibilities of the Commission are:

- (i) To advise the Central Government in the matter of preserving, developing and maintaining the aesthetic quality of urban and environmental design of Delhi.

¹⁶ Delhi Urban Art Commission: Objectives, Jurisdiction and Powers of the Delhi Urban Art Commission, and Guidelines for submission of Projects, January 1975.

- (ii) And also to advise the local authorities in respect of any project of building and engineering operation or any development proposal which affects or is likely to affect the aesthetic quality of the surroundings or any public amenity provided therein.

The Commission has wide powers and it can on its own initiative direct the local bodies and Government organisations to modify or remove any existing street furniture, additions and alterations made in historical monuments/features situated in public gardens, hoardings, sign/bill boards, fountains, etc., which in the opinion of Commission are objectionable either from aesthetic considerations or civic/functional design aspect. The Commission shall also advise the Central Government and local bodies on matters of aesthetic quality of urban and environmental design whenever specially referred to it. The Commission may also promote and secure the development/redevelopment or beautification of any area in Delhi in respect of which no proposals on that behalf have been received from any local body (Chapter III-11(3) of the Act).

In its first annual report 1974-75, the Delhi Urban Art Commission came out with scathing criticism of local bodies and Government agencies. It even expressed doubts about the mechanism and power of the Commission in case its suggestions/directives were not implemented. The report observes: "The Commission's efforts to get certain ugly and undesirable street furniture, sign-boards/hoardings and similar elements, that destroy the visual quality of the city-scape, changed or removed have not met with much success. Various types of excuses and resistances are offered. Firstly, there is considerable apathy to make any change; secondly we are told by the authorities that there are no funds to undertake any change or removal, and they cannot afford to lose the revenue in case of commercial hoardings. According to the Act, it is mandatory for the local bodies and Government organisations to respect and follow the suggestions and directives of the Commission. However, it is not very clear to us as to what would be the mechanism and power to enforce the directives of the Commission in cases where its suggestions/directives are not implemented on one excuse or the other."¹⁷

On the other hand views of the local bodies and other Government agencies about the Delhi Urban Art Commission came to surface in a press report on 19th October, 1975 under a heading "Heat Over Arts and Panel Reports". The report reads thus: "The first annual report of the Delhi Urban Arts Commission, which has criticised the civic bodies for their indifference to "visual squalor in the city" has evoked sharp reactions from the civic officials. A number of them said that "certain high officials" in the UAC before joining the commission were employed in these civic bodies and were responsible for

¹⁷First Annual Report 1974-75, Delhi Urban Art Commission, Vigyan Bhavan Annexe, New Delhi.

designing the buildings they now describe as 'monstrous'.

Delhi Development Authority Vice-Chairman, Jagmohan, said that the commission should confine itself to laying guidelines, study the plans of "monumental buildings" and sensitive areas and not "nibble at" every small problem. The DDA's Nehru Centre, near Kalkaji, has come in for strictures and the commission has said though the project was conceived 10 years ago, DDA had prepared no project report. Mr. Jagmohan denied this and argued that no two architects could think alike. They were determined to stick by certain features, which the commission had criticised. The commission's criticism that architects in Government organisations were subordinate to engineers did not hold good in DDA's case. It was not possible to attract talented architects because of the low Government salaries offered, he said.

Municipal Commissioner, B.R. Tamta, said though the commission was quick to point out flaws, it was not prepared to say what should be done. Practical difficulties were overlooked by the commission. For instance though the commission had criticised the various designs of lamp posts, it chose to overlook the fact that different designs had to be accepted because of varying conditions in the localities. The overhead cables too had attracted criticism. But enormous cost and labour was involved in laying underground cables.

The municipal hoardings, which the commission had assailed, were a source of revenue to the corporation. They had, however, reduced the sites to 450 and confiscated 900 hoardings.

CPWD Chief Engineer, V.R. Vaish, replying to the criticism of the standard of maintenance by the department, said the commission seemed unaware of the fact that due to economy the CPWD had not been sanctioned any money during the last three years for repair work.

As for water towers, described by the commission as "ugly", the Municipal Corporation's instructions were to build them, otherwise it would not be possible to maintain the water supply.¹⁸

Such thoughtful comments on either side are bound to arise. "Some feel that setting up of such a Commission would mean yet another hurdle which a citizen will have to cross. Others more artistic point out that although greatest industrial achievements do emerge from committees but certainly not the greatest painting, sculpture or other such pieces of art. They point out that 'artists do not come in teams'. The more seasoned, however, feel that artistic control over environment is always desirable and that even an artistically imperfect control will have better results than no control at all. Good architecture would become meaningless if surrounded by a framework which is not consistent with its conception. The majestic Red Fort would lose its royal stature if permitted to be surrounded by modern match box structures."¹⁹

¹⁸*The Hindustan Times Weekly*, Oct. 19th, 1975.

¹⁹H.U. Bijlani, "Quality of Life in Cities". Paper presented at 3rd Conference of Mayors of the World's Major Cities in Milan, 1974.

CONCLUSIONS

It is not because of the dearth of law or lack of legal knowledge that we see fellow human beings live in veritable pig-sites jammed like fish in a barrel in the midst of filth and stink and disease and without amenities. "Much can be achieved by phased provision of community facilities and services, by gradual improvement in the physical environments, by purposeful planning of colonies with simple yet useful structures, by reorienting our economic policies to remove the imbalance in our society. And with these steps we can face with courage and confidence the twin challenge of urbanization and abysmal poverty."²⁰ Our attempt should never be to plan "Garden Cities" at exorbitant cost but to avoid congestion and create an atmosphere in which human beings can breathe free and have the basic necessities.

2. The Urban Land Ceiling Act 1976, makes available the necessary tools for acquiring vacant urban land quickly and at convenient costs. The Act, however, has its limitation regarding lands which are not covered under the definition 'vacant'.

3. Follow-up legislations consequent to the Twenty Fifth amendment to the Constitution may be expedited to facilitate acquisition of urban land other than 'vacant' with a provision of ceiling on the inflated urban land prices and issue of public bonds.

4. In the alternative the feasibility of having a separate legislation for urban land acquisition can be considered.

5. Decision on issues like ceiling costs, percentage returns, monthly rentals are to be expedited so that projects for weaker sections/societies as envisaged in the Urban Land Ceiling Act get going.

6. Delays due to non-handing over of title due to quantum of acquisition taking long time to settle, could be avoided by suitably amending the Land Acquisition Act so that title of land could be transferred without prejudice to the rights of the owner.

7. Bolivia has a condemnation law applicable to urban area of La Paz. Such a law permits to condemn land for a particular public use like, low-cost housing projects, water supply treatment plants, right of ways, etc., and pays only partial compensation in cash and remainder in bonds. Similar proposals could be examined. Usually in such cases the authority is vested in separate authorities but it would be advisable to centralize public acquisition and development in a single agency.

8. Land Banks may be established so that execution of urban development plans is not held up for want of land.

9. We may also consider acquiring the right to develop the land if the land itself cannot be acquired by public authority.

10. Controls like zoning regulations, subdivision rules, building bye-laws

²⁰For fuller discussion on this subject see chapter on "Slums and India".

and authority to approve layouts are means of directing urban growth. These techniques which are negative restrictions on the use and development of land have been borrowed from advanced countries specially U.S.A. where itself their adequacy is being questioned. Many times it is seen that the standards set in these regulations are very high and the same may be suitable for affluent societies but certainly not for settlement patterns of low income families. Such standards need modifications.

11. Suitable amendments may be made to the municipal enactments to see that the laws are swift and sufficiently punitive with a view to have effective building and development control in urban areas.

12. Adequate machinery to implement the existing town planning Acts should be created and adequate training should be provided to planners so that they can effectively implement the plans they prepare.

13. Laws of taxation have to be improved so that "betterment charges" and "unearned increment tax on land" are easily recoverable.

14. Revision of building bye-laws is a must to bring them in conformity with the underlying principles of Urban Land Ceiling Act.

15. Establishment of Urban Art Commission, specially in major cities, is a welcome step as it results in artistic control over urban environment.

A Study of Traffic within the Walled City of Delhi—I*

The detailed study of traffic within the walled city of Delhi appears in Part II. We chose the walled city for study mainly because of the complexity of problems it presents. Any recommendation on such a situation is likely to have a bearing on similar situations as well. No attempt has been made in the paper to suggest proposals which could solve the matter once for all and convert the walled city into a motorists' paradise. In fact there cannot be any such proposals in the context of prevalent conditions. The main idea is to provoke reflection on the subject of relieving the pressure in such dense conurbations.

The average density of population in old Delhi is between 400 and 600 persons per acre and in some of its areas it is as high as 1100 per acre or more than 700,000 per square mile. This may well be a world record. Increase in the world urban population, however, is a world wide phenomenon. "In 1850 only four cities on the face of the earth had a population of 1,000,000 or more. By 1900 the number had increased to nineteen. But by 1960, there were 141, and today world urban population is rocketing upwards at a rate of 6.5 per cent per year. This single stark statistics means doubling of the earth's urban population within eleven years. One way to grasp the meaning of change on so phenomenal a scale is to imagine what would happen if all existing cities instead of expanding, retained their present size. If this were so, in order to accommodate the new urban millions we would have to build a duplicate city for each of the hundreds that already dot the globe. A new Tokyo, a new Hamburg and a new Rome and Rangoon—and all this within eleven years. This explains why French urban planners are sketching sub-terranean cities—stores, museums, warehouses and factories to be built under the earth, and why a Japanese architect has blue printed a city to be built on stilts out over the ocean".¹

Engineers in the developing world cannot afford such luxurious and expensive flight of imagination. It was mainly for this reason that we have refrained from making any costly and impracticable proposals in our paper and have

* Presented at the 34th session of Indian Roads Congress held at Gandhi Nagar, Ahmedabad during 25.11.72 to 2.12.73.

¹Alvin Toffler, *Future Shock*, London, Pan Books Ltd., 1971.

remained content by suggesting traffic management techniques rather than costly large scale redevelopment.

The study area of walled city is about 18 sq. kms. and assuming an equal coverage for the narrow streets joining the principal roads which occupy only 0.427 sq. kms. it would be seen that no more than 5 per cent of the total ground area in the old city is covered by roads. Compare this with Tokyo where about 13 per cent of the urban area is occupied by highways and London and Paris where the land share of roads is about 20 per cent or Washington and New York where it is close to 35 per cent. The density of population and the space allocated for roads are two key parameters providing an indication of the size of traffic problem anywhere. On both these counts Old Delhi provides staggering statistics. As if this was not enough, matters are complicated further by factors like heterogenous traffic, encroachments on road space, highly commercial land use, unauthorised factories and godowns, and a traffic management which is partly reluctant and partly inadequate to come to grips with the offenders.

A striking aspect of the volume count data carried out within the walled city is the variation in the proportion of different types of vehicles on various roads. On the vast majority of roads slow traffic constitutes upward of 80 per cent of the total traffic. Certain roads such as Dariba, Sita Ram Bazar and Nai Sarak carry slow traffic in excess of 90 per cent of the total. The share of slow traffic is relatively small on peripheral roads like Asaf Ali Road and Faiz Bazar where it is in the 24-30 per cent range. Similarly, composition of traffic stream on different roads also provides an interesting study. It depicts a large variation of "vehicle types" in the composition of traffic stream. Generally trucks account for less than 10 per cent on all the roads but there are wide variations in the proportions of tongas, hand carts and cycles. A significant example is that of G.B. Road where 64 per cent of the total traffic comprises cycles and cycle rickshaws.

Another interesting revelation was provided by the speed data. It was noticed that there is little improvement in speed in non-peak hours as compared with peak hours. This fact in a way reflects the near constant flow of traffic within the walled city due to concentration of trade and commerce both authorised as well as otherwise. It also brings out how heterogeneous traffic and misuse of available road space hampers the flow of traffic. Even where the speed of flow increased in non-peak hours the improvement was imperceptible—being barely 10 to 20 per cent.

In the paper we have enunciated the problem, tabulated the data and given our own interpretation to that data. We have then enunciated guidelines so that while making recommendations we know precisely the limitations within which one has to work.

The subject of this paper affects almost every one in one way or another and on that account itself is bound to give rise to spirited criticism. We share this anguish with you. But anguish alone cannot solve problems. Have we

ever pondered why it is that in developed countries there is no such phenomenon as encroachment on public lands or roads and why it is that the common man in a developed country readily accepts traffic restrictions on parking, system of one way traffic, reservation of traffic lanes for buses, pedestrian malls, etc. Considering the situation which easily would figure amongst the worst in the world spectacular results cannot be expected overnight particularly in view of the constraints imposed by financial stringency and political and social conditions. But a great purpose will be served if we all apply our minds to this rather pressing problem with which the world's densest conurbations are confronted and formulate practical suggestions which developing countries can gainfully adopt.

Any study of traffic conditions divorced from a lively awareness of human characteristics is apt to remain confined in the realm of theory. One wonders whether engineers making a study of traffic have the right to ignore behavioural patterns any more than others concerned directly with it. The human element is so inextricably woven into the texture of what constitutes traffic that its student may ignore it at the same risk at which a sociologist or an anthropologist may disregard it in his own studies. Any solutions of traffic problems on the assumption that unlimited funds would go into their solution or that human beings would be reformed overnight would be incorrect and unscientific. For the entire edifice of thought and conclusions would cave in if these are based on undependable foundations. Any study of traffic is essentially a study of life itself in miniature. And life is so constituted that one part of it is inseparately connected with the other. Engineers cannot live in an isolated world of their own and say that they have made their own studies abstracted from the other world of human realities and that it is some other specialists' funeral to bring these different segments of life into an integrated whole. We, on our part, have made an attempt in this study towards an integrated approach.

8

A Study of Traffic within the Walled City of Delhi—II*

The walled city of Delhi is plagued by traffic circulation problems of an unprecedented scale, very similar to old city areas in other parts of the country. With a view to understand the problem in its true dimensions, several studies like volume flow counts and journey speed determination were undertaken by the authors on the principal network of roads within this area. This was supplemented by the collection of other relevant data.

The results of the study are presented in the paper. The presentation starts with a description of the existing conditions followed by details of the studies undertaken and analysis of the data gathered. Detailed recommendations including the creation of an enlarged one-way system, introduction of mini-buses, better enforcement of parking and other regulations are made. Points for discussion conclude the paper.

INTRODUCTION

The city of Delhi was destroyed several times by invading armies. It was resurrected once more in 1638 when Shahjahan transferred his Capital from Agra to Delhi and laid the foundation for the seventh city of Delhi. Known as Shahjahanabad then, the city was laid polygonal in plan and engirdled by high walls allround. In keeping with the meagre traffic requirements of those days the city was provided with a generous area of roads among which Chandni Chowk which had a tree-shaded channel flowing in its centre counted as one of the most enchanting streets of the contemporary East.

Even though old Delhi ceased to be the Capital of India when Lutyens's New Delhi came into being in the early part of the twentieth century it has continued to remain, as ever, the hub of commerce and trade activities catering to a vast catchment area extending into Haryana, Rajasthan, U.P. and Punjab. The road system in the old quarter was laid for the leisurely way of life prevailing in the 17th century, little realising that with passage of time

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and changes in modes of transportation, pressure from traffic would multiply many times over. Traffic problems have grown particularly acute after independence when Delhi population went into a steep climb. On the other hand, it has not been easy to evolve solutions to congestion as the highly developed land use within the walled area prevents any large scale redevelopment being undertaken. At best, there could be possibility of a partial relief only, by having recourse to traffic management techniques.

The Authors were motivated by the above facts in taking up an in-depth study of the causes of traffic chaos within the walled city and what sort of wholesale reconstruction, could be done for relieving the situation. Another inducement was that the Delhi study would help in devising solutions to congestion problems of the other old city areas within the country since problems are very nearly the same everywhere.

In the past some studies had been undertaken to assess the road transportation needs of Delhi as a whole, such as when the Master Plan was drawn up in 1959 or when the Bhagwan Sahay Committee examined the Delhi traffic problems in 1963. But none of these went specifically into the peculiarities of walled city traffic. A comprehensive traffic study of Delhi was started by the Central Road Research Institute some time back at the instance of the Metropolitan Transport Team. But it is not known to what extent the old city problems are receiving attention in the course of this study.

EXISTING CONDITIONS

Area included in the study is indicated in Fig. 8.1. For detailed configuration of the network of principal roads within the area either Figs. 8.4 or 8.7 may be seen where the existing one-way regulations are also shown. The study area encompasses about 18 sq. km. Within it the space occupied by the main road system is nearly 0.427 sq. km. Assuming an equal coverage for the narrow streets backing up the principal roads it emerges that only about 5 per cent of the total ground area in the old city is given to roads. This compares unfavourably even with Tokyo where less than 13 per cent of the urban area is occupied by highways, not to speak of other major cities of the world such as London and Paris where the land share of roads is about 20 per cent or Washington and New York where it is close to 35 per cent.

Density of population is one of the key parametres providing an idea about the size of traffic problem anywhere. The walled city has the dubious distinction of claiming one of the highest, if not the highest ever, density of population for any city in the world which according to 1961 census was approximately 58,000 per sq. km. This pales Bombay Island by a big margin where in 1961 the population density was seen to be just exceeding the 39,000 mark. However, the extent of the problem is not revealed by these figures alone. Traffic within the walled city is a function of several other developmental factors as well, for instance the increases taking place in the human population and vehicle fleet of Delhi. As will be seen from Table 8.1. Delhi population has

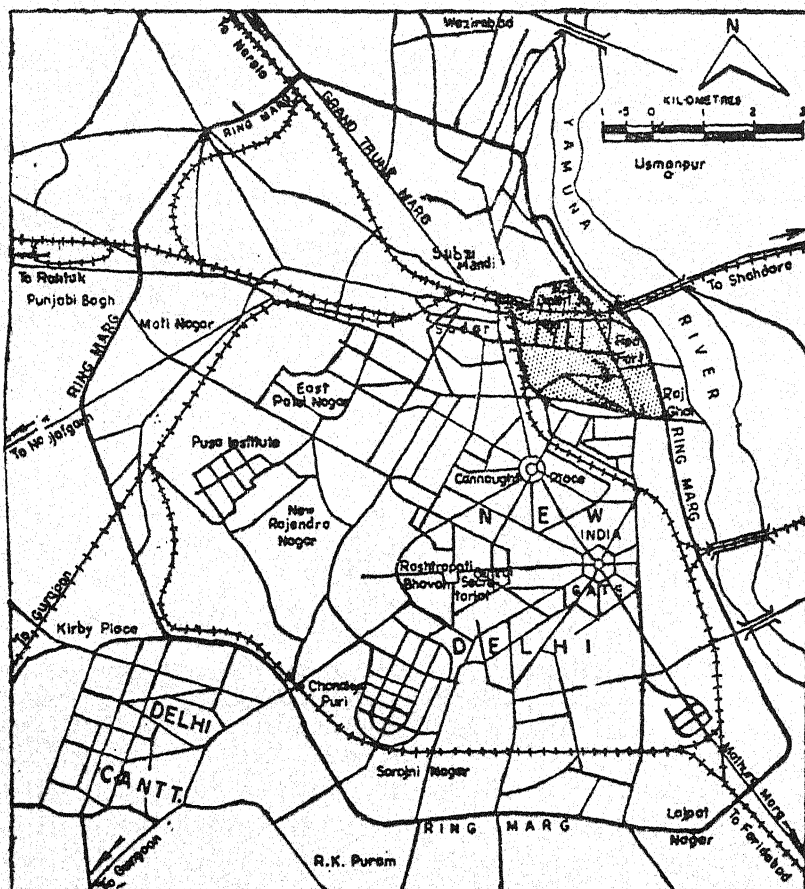


Fig. 8.1. Index map of Delhi showing the study area

Table 8.1
INCREASE OF POPULATION IN DELHI

<i>Year</i>	<i>Population</i>
1901	406,000
1911	414,000
1921	488,000
1931	636,000
1941	918,000
1951	1,744,000
1961	2,659,000
1971	4,044,000

rocketted to four times the 1941 size within three decades. This has happened despite the fact that population within the old quarter has exhibited only narrow fluctuations; rather a slight thinning tendency has been in evidence since 1951. Traffic between the walled city and the surrounding areas has snowballed in tune with the vastly increased commercial, industrial and manufacturing needs of the expanded city. Similarly a phenomenal rise in vehicle population of the city has been a contributor to enlarged interaction between the old city and outer Delhi areas. Within just two decades from 1950 the motor vehicle population has registered an increase from about 12,000 to 2,43,000. The latter figure is exclusive of slow moving vehicles like hand-carts which number about 12,000 and bicycles which are estimated to be over 6 lakhs.

An idea of the commercial and business importance of walled city will be had from the fact that out of about 1,20,000 shops functioning in the whole of Delhi over 33 per cent are located within the walled city. In contrast, the old city's share of population is about 25 per cent. Likewise, out of the total about 37,000 commercial establishments operating within Delhi, nearly 37 per cent are within the walled city itself. In addition, there are a large number of licensed or unlicensed manufacturing units dispersed all over the walled area which generate appreciable traffic and contribute to the growing traffic malaise.

Another strong generator of traffic in the walled city is the Delhi Main Station which caters daily to about 160 trains and 60,000 passengers and an average of 25,000 visitors.

Apart from the congestion brought about by intensification of traffic-generating activities in Delhi as a whole, quality of flow within the walled city is not up to the mark due to preponderance of mixed traffic and inefficient use of the available road space. The mixture of slow and fast moving vehicles such as cycles, cycle-rickshaws, hand and bullock-carts, wheel barrows, scooters, motor-cycles, auto-rickshaws, taxis, trucks, buses, mini-buses, etc., produce difficulties of unprecedented scale in ensuring a smooth movement of traffic. Fig. 8.10 is typical of the heterogeneous conditions obtaining on most of the roads. It is a common sight in walled city to find three or four types of vehicles overtaking each other simultaneously as permitted by their relative speeds (Fig. 8.11). However, because of the limited road space overtaking of slow vehicles is not always feasible. This leads to formation of long queues whenever a slow vehicle breaks down or stops for making and picking deliveries which is fairly common. The situation is exacerbated when the offending vehicle is a bus or truck (Figs. 8.12, 8.13 and 8.14). The traffic jams thus created last the best part of the day. A factor aggravating the position is the forced occupation of footpaths by stationary hawkers and of the carriageways by vendors on wheels (Fig. 8.15). In fact, sidewalks within the walled city are being hardly put to their legitimate use by pedestrians as these are encroached upon perennially not only by hawkers but as well for a multitude of other uses

such as parking of hand-carts, cycles and scooters (Figs. 8.11, 8.12 and 8.16), loading and unloading of goods (Figs. 8.12 and 8.14) and exhibition of merchandise by the abutting shopkeepers. The result is that pedestrians are forced to spill out on the main carriage-ways thereby drastically reducing their capacity. The pedestrian dilemma is illustrated succinctly in Figs. 8.16 to 8.19. While such a manifestation may have been expected on narrow roads without any footpath like Lal Kuan (Fig. 8.18) the wonder is that even wide roads like Chandni Chowk, (Fig. 8.19) are not immune from this disease.

To all intents and purposes parking lots are non-existent within the walled city. This leads to the unprincipled parking on the road itself which sharply reduces the manoeuvring space for legitimate vehicle use. Fig. 8.2 illustrates this in a general way. But a more vivid example is provided by Fig. 8.20 which depicts the queues formed on G.B. road due to indiscreet parking of trucks along the roadside for loading and unloading; the almost complete blocking of one side of the carriageway due to double parking may be noticed.

Delhi Police have imposed a number of traffic restrictions within the walled city for regulating the flow of traffic but this seems not to be having much

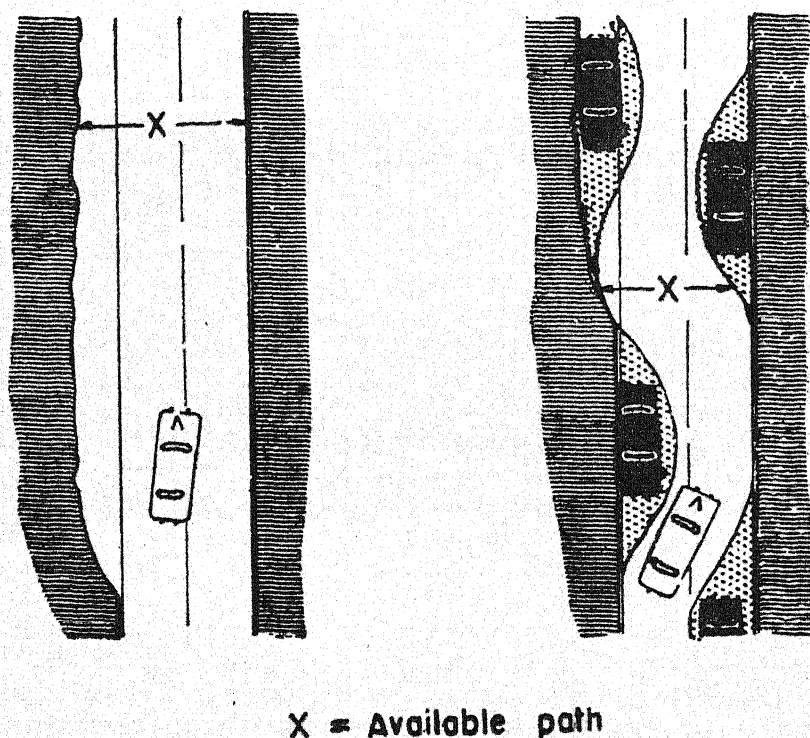


Fig. 8.2. Reduction in manoeuvring space because of parking.

effect. In general the following are the traffic restrictions imposed:

- (i) Heavy vehicles not permitted to ply between 8 to 12 A.M. and 4 to 8 P.M. on practically all roads;
- (ii) Parking of vehicles not allowed between 8 to 12 A.M. and 4 to 8 P.M. on most of the roads with a complete ban on parking on certain roads such as roads No. 9, 14, 15, 21, 22 and 26 (see Appendix 1 for names of the roads);
- (iii) Transport of long bars banned on almost all roads between 8 to 11 A.M. and 5 to 8 P.M.; and
- (iv) Entry of bullock-carts and hand-carts prohibited on a few roads from 8 to 11 A.M. and 5 to 8 P.M., except on Sunday.

Because of the excellent situation the walled city enjoys with respect to Delhi as a whole it would be a natural temptation for land owners to demolish old buildings and replace these by multistoreyed units. Were that possible, traffic problems would have been complicated manifold. But fortunately this has been obviated by the declaration of whole of old Delhi as a slum area under the Slum Areas (Improvement and Clearance) Act of 1956. Under the provisions of this Act if any old building has to be reconstructed it can be done only after satisfying the prevailing building bye-laws.

TRAFFIC STUDIES UNDERTAKEN

To gain insight into the various factors plaguing the traffic circulation, it was decided to undertake the following studies:

- (i) Road inventory;
- (ii) Volume flow counts;
- (iii) Pedestrian counts;
- (iv) Journeys speed studies;
- (v) Broad assessment of the parking problem; and
- (vi) Evaluation of accident experience.

Road Inventory

Detailed field reconnaissance was carried out to gather data on the carriage-way and footpath widths and the spacing and design of intersections. As a part of the inventory study general observations were also made regarding the impediments to vehicular traffic caused by pedestrians and the effectiveness of traffic regulations. Data collected through this comprehensive inventory are incorporated in the tables subsequently presented.

Volume Flow Counts

Studies of traffic volume reveal characteristics of movement which are

important for the evaluation of present traffic service and the development of future traffic circulation plans. The magnitude of traffic on different roads when compared with their respective capacities to accommodate traffic indicates the location and extent of capacity deficiencies. To provide reliable data on these aspects volume flow counts were organised on all the main roads within the study area and those leading into it from the outside. Counts were conducted in general for two hours during the morning peak period, from 9 to 11 A.M., and two hours during the evening rush period, between 4 and 6 P.M. In addition, non-peak hour counts were also made for certain roads so as to compare the variations in traffic flow during different parts of the day. For proper appreciation of the volume flow data, composition in the traffic stream of different vehicle types was also simultaneously recorded.

Volume flow counts for the peak period by vehicle type are summarised in Appendix 1 for the study area roads, wherein the details about road width collected through road inventory study are also incorporated. Peak hour volume count summary for the outer roads leading into the walled city is given in Appendix 2. In actual practice, counts were taken in half hour increments but for the purpose of volume flow, summary flows in two consecutive half hours yielding the maximum have been combined together so as to depict the peak hour conditions. It was found that the peak hour varied from road to road. In general about half the roads experienced peak flow between 5 and 6 P.M. and the other half between 10 and 11 A.M. Very large variations were not discernible within the half hour counts *inter se* as will be seen from the half hour flows plotted for a few roads in Fig. 8.3. These plots are indicative of the uniform rate at which traffic rises and falls on roads within the walled city and point to the absence of a very sharp peak within the peak as has been observed on several arterial routes in other urban areas. Same conclusion emerges from an examination of the peak and non-peak period flow data for some of the study area roads where both these counts were taken which reveals that during day hours there is only a marginal reduction from traffic in the peak hour.

The peak hour volume flows are shown graphically in Fig. 8.4 where the total flow as well as the slow traffic component within it are indicated. In general the heaviest traffic volumes are catered to by roads on the periphery of the study area. Roads within the heart of the walled city carry light but sustained volumes of traffic. Roads carrying the largest traffic are S.P. Mukerjee Marg (opposite the Delhi Main Railway Station, road No. 8), Chandni Chowk (road No. 13) and Faiz Bazar (road No. 15).

A striking aspect of the volume count data is the variation in the proportion of different types of vehicles on various roads. On the vast majority of roads slow traffic constitutes upward of 80 per cent of the total traffic. Certain roads such as Dariba (road No. 14), Sita Ram Bazar (road No. 2) and Nai Sarak (road No. 24) carry slow traffic in excess of 90 per cent of the total. The share of slow traffic is relatively less on peripheral roads like Asaf Ali

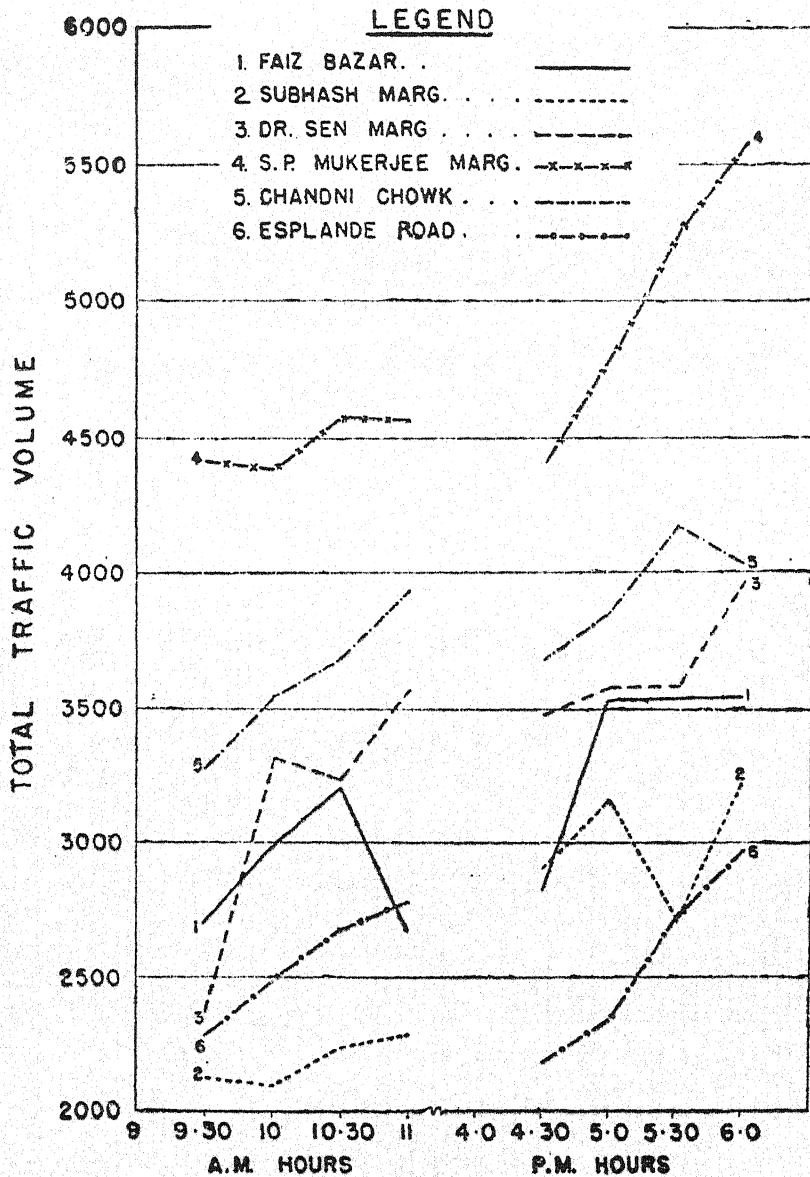


Fig. 8.3. Half hour traffic distribution on selected roads.

road (road No. 6) and Faiz Bazar (road No. 15) where it is in the 24-30 per cent range.

To depict the large variation of vehicle types in the composition of traffic

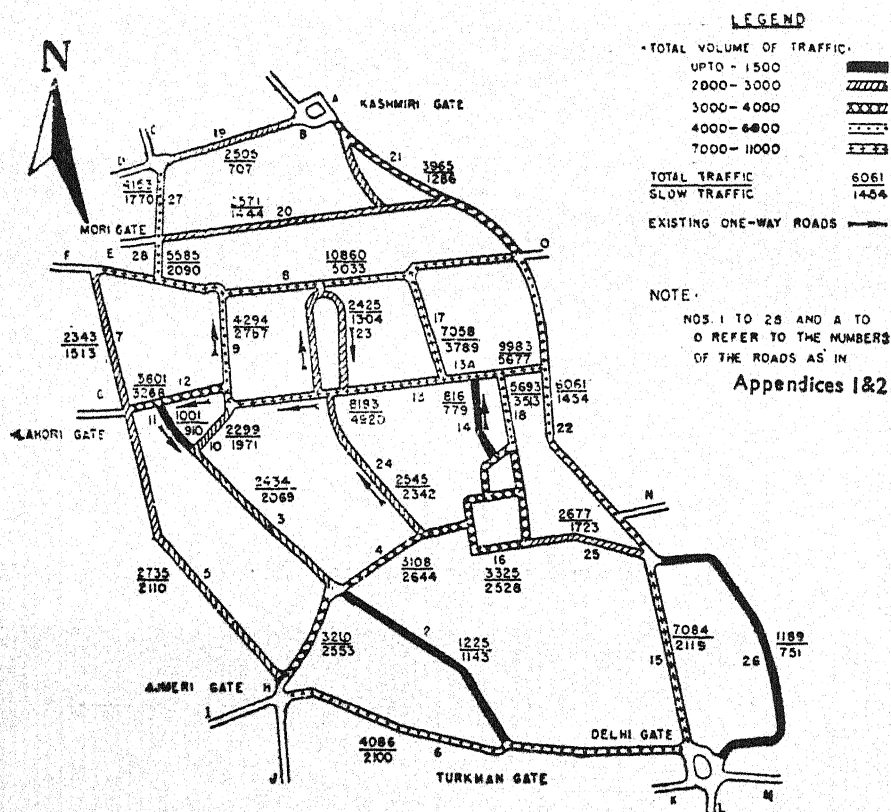


Fig. 8.4. Traffic volumes on roads.

stream, percentage breakdown by vehicle type for six selected roads is shown graphically in Fig. 8.5. Generally trucks account for less than 10 per cent on all the roads but there are wide variations in the proportion of tongas, hand-carts and cycles. A significant example is that of G.B. road (road No. 5) where 64 per cent of the total traffic comprises of cycles and cycle-rickshaws. As expected, predominance of fast traffic is the least on roads deep within the walled city.

Pedestrian Counts

To determine the degree of pedestrian activity within the walled city, pedestrian counts were taken at the same time as the vehicular flows were recorded. Appendix 3 contains a summary of the pedestrian movements. On almost all roads it was found that sidewalk hawkers were extremely

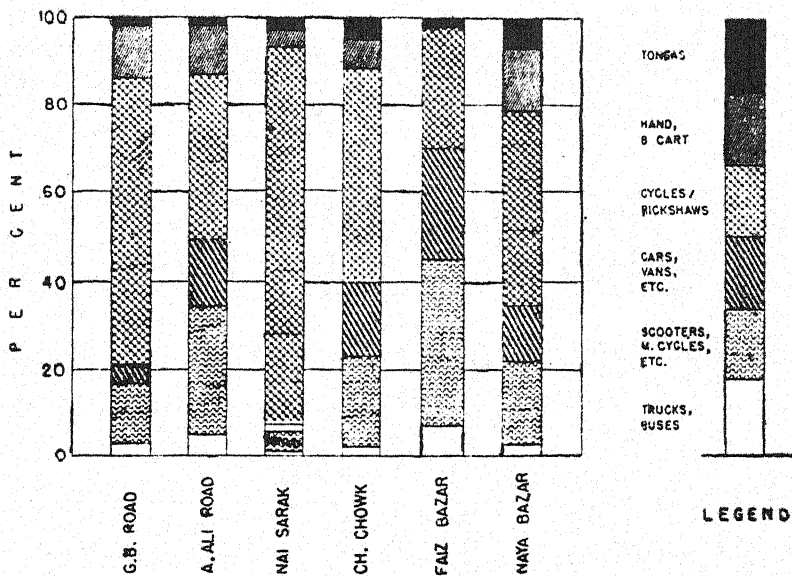


Fig. 8.5. Composition of traffic stream on different roads.

disruptive to footpath use. As vendors thronged about the footpath, the side-walk capacity was reduced sharply and pedestrians were forced to spill out on to the roadway. Figs. 8.16-8.19 depict this succinctly. A different kind of problem exists on other roads where footpaths do not exist at all such as along Dariba (road No. 14) and Esplanade Road (road No. 18). On certain roads the footpaths are not continuous throughout such as Sita Ram Bazar (road No. 2), G.B. Road (road No. 5) and Lal Kuan (road No. 3).

Journey Speed Studies

Road users judge the efficacy of a road network primarily on the basis of journey speeds made possible. Information on journey speeds is, therefore, of vital importance in evaluating the quality of traffic service afforded by a road system. It also provides an interesting insight into the psychology of road usage in as much as many drivers will select a route that allows relatively higher speed in preference to a shorter but slower route and may even avoid making a trip to those roads which may be cumbersome to reach.

The journey speed observations were made by making three trips on each road during the peak hours and another three trips during the non-peak hours. In measuring speeds, the aim was to record the average journey speed along a route including all delays though excluding voluntary stops. The Fig. 8.7 shows the range within which the average peak hour speed on each road

falls. Indicated therein also is the ratio between non-peak hour and peak hour speeds. The speed data in detail are tabulated in Table 8.2. During the rush time journey speeds are abnormally low on most of the roads. On one-third of all roads the speed is restricted to below 10 km per hour. Only 14 per cent of the roads enable speeds between 20 and 25 km per hour. These roads are on the periphery of the area mostly where low proportion of slow traffic and a wide road cross-section enable higher speeds to be attained.

Table 8.2

JOURNEY SPEED DATA FOR THE STUDY AREA ROADS

<i>Sl. No. of the road</i>	<i>Name of the road</i>	<i>Peak hour speed (km/hr)</i>	<i>Non-peak hour speed (km/hr)</i>	<i>Ratio non-peak hour/peak hour speed</i>
1.	Ajmeri Gate Bazar	10.00	10.50	1.05
2.	Sita Ram Bazar	8.23	9.00	1.10
3.	Lal Kuan	6.97	7.35	1.06
4.	Chawri Bazar	6.73	7.40	1.10
5.	G.B. Road	13.00	13.00	1.00
6.	Asaf Ali Road	16.20	16.20	1.00
7.	Naya Bazar	9.40	10.80	1.15
8.	S.P. Mukerjee Marg	16.20	17.50	1.08
9.	Church Mission Road	11.80	13.10	1.11
10.	Katra Baryan	7.30	7.30	1.00
11.	Naya Bans	3.97	3.99	1.00
12.	Khari Bawli	8.72	9.00	1.03
13.	Chandni Chowk (Dr. Sen Marg to Khari Bawli)	13.75	13.75	1.00
13.A	Chandni Chowk	8.90	9.40	1.06
14.	Dariba	4.20	4.20	1.00
15.	Faiz Bazar	24.50	24.50	1.00
16.	All round Jama Masjid	12.50	12.50	1.00
17.	Dr. Sen Marg	19.30	19.30	1.00
18.	Esplanade Road	16.40	16.40	1.00
19.	Nicholson Road	23.00	23.00	1.00
20.	Hamilton Road	21.00	25.80	1.23
21.	Lothian Road	13.10	20.00	1.53
22.	Subhash Marg (Bridge to Red Fort)	14.50	14.50	1.00
23.	Town Hall Road	19.00	19.20	1.01
24.	Nai Sarak	10.20	10.22	1.00
25.	Kasturba Hospital Marg	18.16	20.00	1.10
26.	Ansari Road	20.20	20.20	1.00
27.	Mori Gate Road	8.90	11.55	1.29
28.	Dafferin Bridge	17.40	20.40	1.17

An interesting feature of the speed data is that there is very little improvement of speeds in the non-peak hours as compared to peak hours. This reflects, in a way, the constant hustle and bustle of traffic that goes on within the walled area on account of the concentration of trade and commerce and the difficulties brought on otherwise due to the heterogeneity of traffic and misuse of the available roadway space. Even where speed of flow increases in the non-peak hours the improvement is inappreciable, being barely 10 to 20 per cent.

Broad Assessment of the Parking Problem

Scope of the present study prohibited a comprehensive parking survey being carried out to accurately gauge the size of the parking problems. However, a general assessment of the parking problem was undertaken for all the roads with respect to the observance of parking restrictions imposed thereon by the Traffic Police and the impact of parking practices on traffic-carrying ability of the roads. Impression gained was that the parking regulations were being freely flouted on most of the roads and there was little or no enforcement. This resulted in severe bottlenecks particularly on narrow roads like Sita Ram Bazar (road No. 2), Lal Kuan (road No. 3), Chawri Bazar (road No. 4) and Nai Sarak (road No. 24). Even where parking is permitted, impulsive manner of parking was seen to curtail road capacity. Part of the difficulty was traced to lack of appropriate signs announcing the parking restrictions and absence of any demarcation of parking areas into stalls of suitable dimensions for obtaining the maximum turnover.

Evaluation of the Accident Experience

A scrutiny of traffic accident figures published by the Delhi Traffic Police reveals that in the study area the number of accidents taking place is insignificant except for a few of the roads. This may be due partly to very slow speeds obtaining on the road network which will naturally inhibit accidents of serious nature. On the other hand, because of severe congestion it is likely that the number of non-injury type accidents should be higher. But since the present accident reporting system is not very efficient, conceivably most of the non-injury accidents are not finding a way into the accident records.

Among the main roads the maximum number of accidents (both injury and non-injury) is reported from Subhash Marg (road No. 22) where the accidents showed an increase from 255 in 1968 to 311 in 1970. A sizable number of accidents is ascribed to S.P. Mukerjee Marg (road No. 8) and Asaf Ali road (road No. 6) also though these are on the decline. On S.P. Mukerjee Marg the number of accidents fell from 107 in 1968 to 90 in 1970 and on Asaf Ali road from 65 in 1968 to 60 in 1970. In contrast, the number of accidents recorded for some of the other roads like Ajmeri Gate Bazar (road No. 1) and Church Mission Road (road No. 9) is only 6 to 7 annually.

INTERPRETATION OF THE COLLECTED DATA

Flows and Capacity

Customarily, for evaluating the efficiency of a road network the practice is to match the volume flows on different roads against their respective practical capacities. This approach easily works on rural roads where generally uninterrupted flow conditions prevail. But on urban arterial routes, still more on streets within the heart of busy business areas, it is not possible to follow this method of analysis on account of the very frequent traffic interruptions caused by inter-vehicular conflicts in mixed streams of traffic and intensive roadside development. Most of the trips in busy business areas, as in the walled city, are of stop-and-start type such as for the loading and unloading of goods which though fulfilling a highly essential need result in restricting the smooth flow of traffic. Consequently as the volume of traffic and inter-vehicular friction rise, the quality of flow falls to unexpected low levels.

Highway Capacity Manual has defined six "levels of service" with regard to the traffic flow conditions. For downtown streets, *i.e.*, those in the heart of business areas the three lowest levels of service are described roughly as under:

- (i) *D* level of service...approaching unstable flow conditions; average overall speeds equal to or more than 10 miles per hour (about 16 km per hour);
- (ii) *E* level of service... unstable flow conditions; average overall speeds below 10 miles per hour (16 km per hour) though traffic is still able to move; and
- (iii) *F* level of service... forced flow conditions with frequent jamming of vehicles; speeds not meaningful, most of the movements being of stop-and-go nature.

As will be clear from the results of journey speed study presented earlier almost all roads within the walled city render only *F* level of service. Under normal circumstances when traffic conditions reach this intolerable state, a drop in the total volume of trips should be expected. But it is a measure of the walled city's importance as a business and shopping complex that traffic continues to surge in and out unmindful of the strain involved. An obvious conclusion to draw from this is that most of the trips being made to the walled city are of essential character, for business reasons, which could not hope to be diverted unless there was a wholesale change in the land use of the area. This is an unlikely project.

It will be seen from the volume flow summary in Table 8.2 that slow traffic constitutes almost 50 to 90 per cent of the total traffic on most of the roads. Within the slow traffic major share is of cyclists which form about 80 per cent

of the slow component. In fast traffic the lion's share is of the scooters, scooter-rickshaws and motor-cycle rickshaws. Except for lone case of S.P. Mukerjee Marg (road No. 8) which is the road opposite the Delhi Main Railway Station the percentage of trucks in the fast traffic is below 10. On S.P. Mukerjee Marg the percentage is about 20. The normal procedure in cases of capacity analysis is to homogenise the mixed traffic in terms of a common vehicle (usually car) by the use of equivalency factors related to interference value of each vehicle type. The equivalency factors are determined by comparing the speed distribution of passenger cars *vis-a-vis* other vehicle types at given volumes of traffic. The greater the speed difference, the higher would be the value of passenger car equivalency factors. But this approach flounders on rocks in walled city conditions, since speed differential between different vehicle types is to all intents and purposes negligible. Moreover, traffic is of predominantly mixed character, in which cars have but a minor share and most of the fast vehicles consist of scooters, scooter-rickshaws, etc. PCU (passenger car unit) equivalents lose all meaning when the whole of traffic stream is moving at a snail's pace, overtaking opportunities are almost non-existent and in accessibility the smaller, slow vehicles have an edge over the bigger, fast vehicles.

Thus evaluation of the road network within the walled city by relating the present volumes to the practical capacity of each road after applying PCU equivalents has to be abandoned as a futile exercise. The only approach feasible is that the quality of service may be judged on the basis of average overall travel speeds, which is the way a road user will normally rate the acceptability of operating level on any road. This is why in the various presentations traffic has been indicated in terms of total number of vehicles rather than as PCUs.

Nonetheless just to give an idea as to how the problem will look like if volumes are converted into PCUs for collating with practical capacity values, Table 8.3 has been prepared on that basis for some of the study area roads. This has been done by assuming an equivalency factor of 0.4 for cycles/cycle-rickshaws which are a major component in the traffic stream, a factor of 2 for tongas, trucks and bullock-carts, and 0.8 for scooters/scooter-rickshaws/motor cycles. The equivalents have been chosen more from the consideration of relative value of respective vehicle types in causing inter-vehicular conflict at low speeds than on the basis of speed differentials which is the criterion normally followed when selecting equivalency values. No pretence is made of defending the above factors, since these could be criticised on several counts. One criticism could be that on equal space basis it would be incorrect to allocate the same factor to cycles and cycle-rickshaws, and to scooters and scooter-rickshaws. This distinction was not made purposely since the number of cycle-rickshaws and scooter-rickshaws is very small as compared respectively to cycles and scooters.

Shown side by side in Table 8.3 are the practical capacity values of concerned roads both for the total carriageway width actually in position and the effective width that is really available on account of the indiscriminate parking

Table 8.3
CAPACITY OVERLOAD ON DIFFERENT ROADS

Road No.	Name of Road	Total traffic flow	Total traffic in PCUs	Actual* C/W width (metres)	Practical capacity for actual carriage-way width (PCU)	Effective C/W width (metres)	Practical capacity for effective carriage-way width (PCU)	Overload factor for col. 6 \div (col. 4 \div col. 6.)	Overload factor for col. 8 \div (col. 4 \div col. 8)
1	Ajmeri Gate Bazar	3210	2339	8	750	5.79	300	3.1	7.8
6	Asaf Ali Road	4086	3621	21 (divided)	3500	12.19	1600	1.04	2.26
8	S.P. Mukherjee Marg	10860	11041	21 (divided)	4000	12.19	1600	2.76	6.90
13	Chandni Chowk (one way)	8183	6383	18 (divided)	3200	9.14	1650	1.99	3.86
13A	Chandni Chowk (two way)	9983	7693	18	2800	9.14	1650	2.75	4.81
15	Faiz Bazar	7084	5942	20 (divided)	3200	18.29	2600	1.85	2.28
12	Khari Bawli (one way)	3801	3225	15	3200	9.14	1650	1.00	1.95
17	Dr Sen Marg	7058	5522	21 (divided)	4000	15.24	2000	1.38	2.76
22	Subhash Marg	6061	5067	26 (divided)	4400	21.95	3200	1.13	1.90
24	Nai Sarak (one way)	2545	994	6	800	4.57	600	1.24	1.66

* For details see Appendix I.

and other malpractices. From the service volume/capacity ratios worked out in this Table, it will be seen that most of the roads are overloaded to the extent of 100 to 300 per cent against what might be regarded as reasonable operating conditions for urban roads of all-purpose character. Obviously, roadusers frequenting the walled city do not evaluate the traffic service by that yardstick, otherwise as observed in the case of rural roads they would have long ago abandoned trip-making to this area.

If traffic service is judged from the point of view of overall speeds then analysis of data in Fig. 8.7 will show that out of the total 28 roads studied within the walled city only 11 enable speeds in excess of 16 km per hour. In other words, according to the criteria set forth in Highway Capacity Manual as much as 60 per cent of the entire network would be categorised under level of service 'E' or 'F'. This should not be taken to mean that the balance 40 per cent network offers a satisfactory operating level. Since speeds on the remaining roads are generally below 15 miles per hour (24 km per hr.), which is the limit for 'C' level of service, these would deserve to be categorised under 'D' level of service only. This could hardly be termed as a healthy state of affairs for a shopping and business centre of the eminence of walled city.

Speed Characteristics

To better understand the effect on speed of different variables a number of graphs were drawn to study if any compatible correlations could be deduced. Speed and percentage of slow vehicles on different roads are plotted in Fig. 8.8. In the same figure, the product of speed and effective carriageway width has been plotted against the percentage of slow moving vehicles. Both plots show in clear enough terms the harmful effect of slow moving vehicles. Relevant to conditions within the walled city the speed of traffic is seen to fall from about 25 km per hour to 5 km per hour as the share in traffic of slow vehicles increases from 20 to 95 per cent. This inference should be regarded as symptomatic rather than definitive as speed on a road will be the function of several other variables as well such as the parking practices prevalent, malpractices in overtaking, and spacing between junctions.

An analysis was also made of the effect on speed of two-way street operations *vis-a-vis* one-way operations, as the belief commonly held is that one-way working is relatively more efficient both as regards capacity and speed due to reduced friction between the vehicles. A plot of speed against hourly traffic volume per metre effective width of carriageway is drawn in Fig. 8.9. Strangely no clear superiority of one-way operations over two-way working emerges in this figure. Rather two-way roads seem to show somewhat better utilisation and improved speeds. This may look odd at first sight. But experience both in U.K. and U.S.A. has been that a somewhat contradictory relationship exists between two-way and one-way working. This is explained

to the fact that on relatively narrow streets, with parking on both sides and space in between just sufficient for two moving lanes of traffic, by a switch over from two-way to one-way operations, drivers show the tendency of queuing up into one lane rather than accepting a tight two-lane flow. On the other hand with two-way operations two-lane flow continues because no choice is available. Since within the walled city due to narrow width of the carriageways traffic moves in a packed manner, two-way operations have come out to be superior to one-way operations.

One-way operations could not, however, be belittled just for this reason. On conversion to one-way working certain other benefits accrue which are valuable in their own right. For instance, when the width is narrow and overtaking impossible on account of constant barrage of traffic from the opposing direction, then on a two-way road with the stalling or stopping of even a single vehicle the entire equilibrium of traffic could get drastically upset. This could give rise to queues extending far behind the parked vehicle. What is worse, like a wave this effect might perpetuate for a long time. It will not be so when a two-way road is converted to one-way operations as over-taking opportunities even though limited will not be altogether lacking. Possibility of jams to occur will, therefore, be considerably minimised.

The comparison between one-way and two-way operations has been extended further in Table 8.4, where traffic flows and speeds on two-way and one-way roads of more or less equal width are tabulated. Like the proverbial ostrich's egg the analysis reveals mixed results. On some roads, two-way

Table 8.4
PEAK HOUR SPEED DIFFERENCE ON ROADS OF SIMILAR WIDTH

<i>Road No.</i>	<i>Name of Road</i>	<i>Total* traffic in the Peak hour</i>	<i>Carriageway Width (metres)</i>	<i>Whether one-way or two-way</i>	<i>Peak hour speed (Km/hour)</i>
24	Nai Sarak	2545	6	One way	10.20
2	Sita Ram Bazar	1245	6	Two way	8.23
14	Dariba	816	7	One way	4.20
3	Lal Kuan	2434	7	Two way	6.97
11	Naya Bans	1001	8	One way	3.97
4	Chawri Bazar	3108	8	Two way	6.73
12	Khari Bawli	3801	15	One way	8.72
18	Esplanade Road	5693	13.7	Two way	16.40
13	Chandni Chowk	8183	18	One way	13.75
5	G.B. Road	2735	18 (divided)	Two way	13.00
7	Naya Bazar	2343	18 (divided)	Two way	9.40
13 A	Chandni Chowk	9983	18	Two way	8.90

*Details in Table 2.

working has come to be in better light, while the reverse has been the case in others. Of course, these data are for a very limited number of roads from which firm conclusions could not be drawn with full confidence. Another limitation of this comparison is that the effect of traffic volumes has not been considered.

Pedestrian Characteristics

The pedestrian flows measured on different roads are summarised in Appendix 3. Indicated therein also are the physical capacities of footpaths which have been calculated on the basis of 25 persons per minute per 0.6 m width of footpath after deducting 0.9 m in shopping precincts and 0.45 m elsewhere for side friction as recommended in U.K.* Comparison of the physical capacity values with actual pedestrian volumes will show that by and large the available capacity for pedestrians on all roads is far in excess of the volumes being actually experienced. Only exception is of those roads where no footpaths exist at all. What is of concern, however, is that far and away on none of the roads the footpaths are being put to their intended use, a phenomenon which has been discussed to some length already. A factor contributing to the non-use of footpaths is the prevailing policy of Municipal Corporation of allowing abutting shopowners to extend their shop limits beyond the built-up area by 0.5 metre on a nominal payment. In due course, this becomes a permanent encroachment. The effect of inefficient utilisation of footpaths is that the pedestrians are willy nilly forced to use the main carriageway, thereby eroding the roadway capacity and adding unwittingly to complexity of the traffic problem.

RECOMMENDATIONS

Analysis of the data collected has revealed indisputably that the road system within the walled city inherited from pre-automobile era has proved to be incapable for present-day traffic. The result of growing number of vehicles all forcing their way through the narrow, medieval road system has increased congestion and inefficiency. Manifestations of the problem are seen in ever-rising complaints from the roadusers about travel delays, lack of parking, and obstruction of the roadway on account of continuous loading and unloading of goods. Deterioration in the accessibility of the area has been accompanied by a grave erosion in the environmental values, about which unfortunately public concern has not surfaced to the extent it should have considering the degree of the problem. Increasing motorisation and proliferation of the trade activities has been responsible for the intimidation of area inhabitants on a

*The U.K. recommendation were converted into metric units before use.

vast scale, through the mediums of vehicular traffic, noise, fumes, vibration and dirt. Freedom of pedestrian movement has more or less been destroyed completely—a far cry from the leisurely Moghul times when the old city was at its zenith of glory.

Where then lies the solution to traffic problems of walled city? Any policy of widening the existing streets to cope with more traffic must be ruled out straightway, since considering the compactness of the area it will require very costly redevelopment which it would be impossible to afford. Master Plan recommendations, which were along these lines, have not proved to be practicable except for some of the roads. Moreover, this will tantamount to changing the character of the walled city completely out of recognition which will not be found acceptable. On the same reasoning, it will be unthinkable to adopt any solution involving the construction of elevated roads. Logically, this leaves open only one option for improving access and retrieving the environmental values, which is, to curtail the amount of traffic entering the walled city. This will have to be achieved through a combination of controls, the extent of which will depend on the assessment about volume and character of traffic that ought to be permitted on the existing streets consistent with creation of good environmental conditions.

For reduction of traffic one of the obvious starting points is to see if any extraneous traffic that had no real business in the walled city could be filtered out. As has been mentioned earlier this remedy is of no avail since intolerable operating speeds desist but the most needy to venture into the walled area. In other words, it has to be accepted that all the traffic coming into the old city presently belongs to essential category. This implies that if any controls are imposed on the entry of traffic, that could have an adverse effect on the commercial and business turnover of the area. Since no major reconstruction can be undertaken, to limit accessibility, controls will be inevitable. It will be a matter of good public relations to ensure that this position is clearly understood by all.

In general, the following steps would be required to achieve the objectives of better accessibility and preservation of environmental values within the walled city:

- (i) Keeping down the number and type of vehicles to a level compatible with the environmental requirements;
- (ii) Prevention of all through movements wherever these occur;
- (iii) Reorganising the circulation of essential traffic though not necessarily by the shortest route;
- (iv) Ensuring optimum use of the available street space, through requisite enforcement and application of traffic management techniques, particularly as regards the pedestrian movement;
- (v) Converting streets and areas which are used predominantly by pedestrians/slow traffic for their use alone;

- (vi) Limiting the loading and unloading activities to specified hours only;
- (vii) Giving preference to public service and hired vehicles rather than to private cars which will be hungry of parking space;
- (viii) Evolution of a rational parking policy, firmly directed towards the environmental objectives; and
- (ix) Exercise of due control over the change of land use with the object of reducing traffic generation.

On the plank of guidelines enumerated above, and traffic data analysed earlier, the following specific recommendations are made for alleviating the traffic problems of walled city.

One-way System

For improving circulation it will be desirable to make some more roads one-way. The suggested total system of one-way roads is shown in Fig. 8.6. No claim is made that this system will improve the overall journey speeds within the walled city, since analysis of the existing data has shown that one-way operations will not always turn out to be superior. But this drawback is outbalanced by certain other advantages, for instance the availability of greater number of overtaking opportunities, that could have a marked effect on the occurrence of traffic jams so frequent in the mixed traffic conditions of today. On the whole, creation of a larger one-way network will be beneficial and have a bracing effect on circulation even though there will be increase in some of the journey lengths.

Parking Lots

Complementary to the creation of an enlarged one-way system it would be essential to reduce the amount of on-street parking to the minimum. This could be made possible by creating car parks, whether surface or multi-storeyed, at strategic locations on the fringe of the walled city or within the walled boundary itself, where feasible. Suggestions for the location of these parking lots are contained in Fig. 8.6. Encouraging the use of parking lots, coupled with stiff enforcement of on-street parking restrictions referred to below, will go a long way toward achieving optimum use of the available road space.

On-street Parking Restrictions

Among the internal roads it will be desirable to put a complete ban on parking between 8 A.M. and 8 P.M. except for the possible exception of Chandni Chowk. There could be some relaxations in this respect on peripheral roads such as Asaf Ali road (road No. 6), G.B. road (road No. 5) and Ansari road (road No. 26).

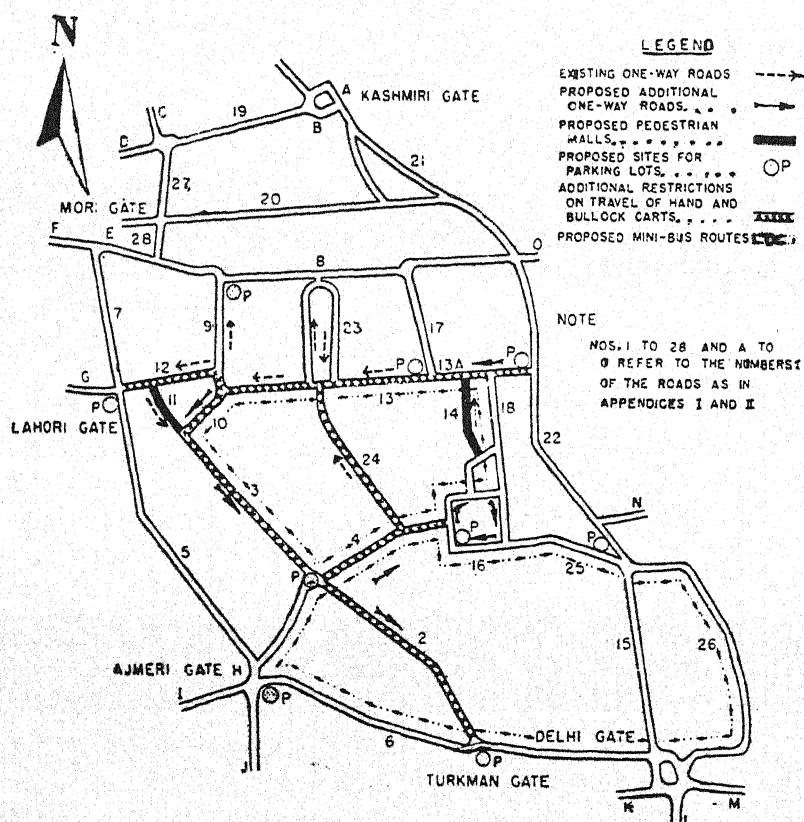


Fig. 8.6. Recommendations for Traffic Improvement.

Movement of Heavy Transport Vehicles

At present the entry of heavy transport vehicles is prohibited between 8 to 12 A.M. and 4 to 8 P.M. on majority of the roads. On some roads the restrictions imposed are of a shorter duration. Trips made by these vehicles are generally for servicing the commercial and business establishments by way of loading and unloading of trade merchandise. Had there been any service roads worth the name at the back of the buildings, the transport vehicles could have been forced to perform loading and unloading operations along these lanes. Walled city is not fortunate in this respect however. Thus the only option available for improving the quality of traffic service is that the entry of heavy transport vehicles may be banned altogether between 8 A.M. to 8 P.M. on all inner roads.

As far as peripheral roads are concerned, restrictions on movement of these

vehicles could be continued during the periods of peak flow, as is already the case.

These restrictions are, however, not intended to be applied to passenger transport vehicles, *i.e.*, buses.

Shifting of Transport Companies

On some of the roads like Naya Bazar (road No. 7) and G.B. road (road No. 5) most of the problems of congestion and inefficient traffic operations are traceable to ubiquity of trucks which are continuously engaged in loading and unloading of goods from premises of transport companies. It will be in fitness of things to eliminate the presence of these trucks by putting pressure on booking and forwarding agents located along these roads to shift to new sites of operation. In the Master Plan for Delhi, there was a proposal to have goods terminal and parking lots at different points in the capital region, for example at Motia Khan, Shahdara, Azadpur, Okhala Industrial Estate, off Ring road near Kashmiri Gate, and off Rohtak road in the vicinity of Nangal Power Station. Some of these are already in the pipeline. Gradual shifting of the booking and forwarding agencies to these terminal stations will go a long way in reducing congestion on roads at the periphery of the study area. An example that could be cited in support of this recommendation is the shifting of Interstate Bus Terminal from S.P. Mukherjee Marg (road No. 8) a few years back which had a salutary effect on the quality of flow on that road.

Pedestrian Malls

On certain roads where slow traffic constitutes upward of 90 per cent of the total traffic, it might be desirable to eliminate wheeled traffic completely during the working hours, *i.e.*, from 8 A.M. to 8 P.M. This could be achieved by the simple expedient of inserting posts in slots at either end. This is not a revolutionary concept by any means as it has already been tried with good measure of success in several cities in the West, like Cologne, Essen and Bremen in West Germany, Rotterdam in Holland, Springfield in the U.S.A. and Coventry in U.K. Suggestions as to roads in the walled city which might be freed for pedestrian use solely are given in Fig. 8.6 The implementation of this recommendation will improve the standard of environment on these roads immeasurably. In due course this practice could be extended to some more roads.

Restriction on Bullock and Hand Carts

Certain restrictions on the movement of hand and bullock carts are already being enforced by the Traffic Police on a number of roads. While continuing the same it might be desirable to extend these to some more roads, as suggested in Fig. 8.6.

Removing Obstructions from Footpaths

It could not be emphasised too strongly that the footpaths which are meant legitimately for pedestrians' use should be restored to them through strict enforcement. This will require a close watch on the parking of vehicles of any kind on footpaths, a complete ban on hawkers peddling their wares thereon and stringent restrictions on encroachments by the abutting shopkeepers. A system of heavy fines may have to be devised to achieve this end. The prevailing system of Municipal Corporation permitting encroachment of footpaths by shopkeepers on payment would need to be discontinued forthwith. Not that these suggestions are being made for the first time, but there has been no concerted follow-up in this regard by any of the enforcing agencies. Nuisance arising from the illegitimate occupation of sidewalks has already been succinctly illustrated in Fig. 8.15.

Encouragement to Mini-buses

Concomitant with the recommended one-way system it would be desirable to encourage the plying of smaller buses within the old city so as to provide the desired mobility for passenger movements and to act as a competitor to motor vehicles whose entry would become restricted due to stringent no-parking regulations. For this purpose, organisation of two circulatory mini-bus routes as indicated in Fig. 8.6 is recommended. If necessary it might even be desirable to subsidise this bus system if that can help in keeping off a good chunk of motorised traffic from the old city roads. This policy is already being followed in several cities abroad, such as Stockholm in Sweden.

Relocation of Wholesale Business Centres

At the moment a lot of wholesale activity in sanitaryware and hardware trades goes on within the walled city. As a long-term measure the Delhi Development Authority (DDA) should give consideration to creating one or two wholesale markets for these trades away from the walled city. This should automatically interest the existing business establishments which are beginning to be plagued by transportation and other problems of various sorts. This is already being done in the case of cycle trade, presently concentrated along the Esplanade road (road No. 18), for which a new market is under construction by the DDA away from the walled city.

Provision of Proper Bus-bays

The location and design of existing bus-bays is in need of a detailed review within the entire walled area. An improvement in the situation is called for particularly along Subhash Marg (road No. 22), S.P. Mukerjee Marg (road No. 8) and around Jama Masjid (road No. 16).

POINTS FOR DISCUSSION

Arising out of the study of traffic problems of walled city of Delhi carried out above, the following points will appear to warrant further discussion from the angle of developing solutions for similar problems elsewhere:

- (a) Strategy to be adopted for the planning of traffic management measures in congested areas which may not straightway be the liking of business establishments.
- (b) Methods of evaluating the traffic service under congested conditions with heterogenous composition of traffic.
- (c) One-way vs. two-way operations.
- (d) Controlling the problem of pedestrian movements within busy business areas.
- (e) Restricting the use of narrow streets for pedestrians only by banning the entry of vehicles during business hours.
- (f) Giving preference to public service and hired vehicles by imposing stiff controls on private cars and trucks.
- (g) Provision of mini-bus services at subsidised cost.
- (h) Effective enforcement of parking and other traffic controls.

APPENDIX I

VOLUME FLOW SUMMARY FOR STUDY AREA ROADS

Road No.	Name of Road	Road Cross Section*	Fast Traffic				Slow Traffic				Total (Fast + Slow Traffic)	Percentage Slow of Total traffic
			Trucks & Buses	Scooters and Rickshaws	Cars, Vans, Tempos, 4-Seater & Motor-rickshaws	Total	Cycles & Cycle-rickshaws	Hand & Bullock Carts	Tongas	Total		
1.	Ajmeri Gate Bazar	2 × 2.75 m FP + 8 m CW	5	474	178	657	2,084	330	139	2,553	3,210	80
2.	Sita Ram Bazar	2 × 1.8 m FP + 6 m CW	—	73	29	102	1,014	108	21	1,143	1,245	91
3.	Lal Kuan Bazar	7 m CW	4	249	112	365	1,709	331	29	2,069	2,434	85
4.	Chawri Bazar	2 × 2.75 m FP + 8 m CW	10	284	170	464	2,459	165	20	2,644	3,108	85
5.	G.B. Road	4.3 m FP + 2 × 9 m CW + 1.4 m CV	73	374	178	625	1,746	322	42	2,110	2,735	77
6.	Asaf Ali Road	3.3 m FP + 9 m CW + 1.5 m CV + 12 m CW + 5 m FP	188	1,204	594	1,986	1,570	464	66	2,100	4,086	51
7.	Naya Bazar	2 × 2.5 m FP + 2 × 9 m CW + 1 m CV	54	460	316	830	1,025	332	156	1,513	2,343	65
8.	S.P. Mukherjee Marg	2 × 3.7 m FP + 2 × 10.5 m CW + 1.2 m CV	1,127	2,808	1,892	5,827	3,386	629	1,018	5,033	10,860	64
9.	Church Mission Road (one way)	2 × 3 m FP + 8.5 m CW	16	1,150	371	1,537	2,358	224	175	2,757	4,294	64
10.	Katra Baryan	2 × 1.8 m FP + 8 m CW	6	222	100	328	1,668	238	65	1,971	2,299	86

11.	Naya Bans (one way)	2 × 3.7 m FP + 8 m CW	—	91	—	91	679	230	1	910	1,001	91
12.	Khari Bawli (one way)	2 × 3 m FP + 15 m CW	2	416	117	533	2,353	648	267	3,268	3,801	86
13.	Chandni Chowk (one way)	2 × 3.4 m FP + 18 m CW	28	1,901	1,334	3,263	3,975	586	359	4,920	8,183	60
13A.	-do-	-do-	188	2,471	1,647	4,306	4,663	597	417	5,677	9,983	54
14.	Dariba (one way)	7 m CW	—	35	2	37	743	20	16	779	816	95.5
15.	Faiz Bazar	3.7 m FP + 12 m CW + 1.7 m CV + 8 m CW + 3.7 m FP	519	2,660	1,786	4,965	2,030	67	22	2,119	7,084	30
16.	Jama Masjid	9.7 m CW	12	583	202	797	2,122	184	222	2,528	3,325	76
17.	Dr. Sen Marg	3.7 m FP + 12 m CW + 1.5 m CV + 9 m CW + 1.5 m FP	211	1,578	1,480	3,269	3,263	131	395	3,789	7,058	54
18.	Esplanade Road	2 × 3 m FP + 13.7 m CW	25	1,652	503	2,180	2,726	291	496	3,513	5,693	62
19.	Nicholson Road	2 × 3.3 m FP + 7.3 m CW	172	1,364	262	1,798	613	64	30	707	2,505	28
20.	Hamilton Road	2 × 4 m FP + 9.5 m CW	70	687	196	1,127	1,342	90	12	1,444	2,571	56
21.	Lothian Road	2 × 1.5 m FP + 14.5 m CW	343	1,649	618	2,679	1,273	13	—	1,286	3,965	32
22.	Subhash Marg	8.5 m FP + 13 m CW + 3.7 m CV + 13 m CW + 7.5 m FP	299	2,725	1,583	4,607	1,376	62	16	1,454	6,061	24
23.	Town Hall Road (one way)	2 × 2.6 m FP + 8 m CW	14	743	364	1,121	1,186	41	77	1,304	2,425	54
24.	Nai Sarak (one way)	2 × 2.5 m FP + 6 m CW	4	158	41	203	2,166	109	67	2,342	2,545	92
25.	Kasturba Hospital Road	2 × 3 m FP + 8 m CW	5	630	319	954	1,568	131	24	1,723	2,677	64.5
26.	Ansari Road (D.G. crossing)	1.5 m FP + 12 m CW + 15 m FP	3	233	202	438	680	50	21	751	1,189	63
27.	Mori Gate Road	2 × 2 m FP + 11 m CW	233	1,390	760	2,383	1,503	160	107	1,770	4,153	43
28.	Dafrin Bridge	2 × 3 m FP + 13 m CW	203	2,246	1,046	3,495	1,669	204	217	2,090	5,585	37

* FP = Footpath CW = Carriageway CV = Central verge.

APPENDIX 2

VOLUME FLOW SUMMARY FOR ROADS LEADING INTO THE STUDY AREA

Road No.	Name of the Road	Fast Traffic				Slow Traffic				Grand total slow and fast traffic	Percentage slow of total traffic
		Trucks, Buses	Scooters and Scooter-rickshaws	Cars, Vans, 4-seater motor Rickshaws	Total	Cycles & Cycle Rickshaws	Hand & Bullock Carts	Tongas	Total		
A	Road from Alipur Road to Kashmere Gate	266	1,441	967	2,674	877	1	2	880	3,554	25
B	Kashmere Gate to Nicholson Road	160	634	390	1,184	626	14	2	642	1,826	35
C	Court Road	203	1,649	811	2,663	758	9	27	794	3,457	23
D	Tis Hazari Road	102	1,290	784	2,176	612	35	96	743	2,919	25
E	G.T. Road	198	2,078	398	2,674	1,179	218	254	1,651	4,325	38
F	Pul Mithai	60	1,002	228	1,290	2,409	303	180	2,892	4,182	69
G	Lahori Gate Bridge	4	210	119	333	4,475	381	369	5,225	5,558	93
H	Opposite Delhi College	142	3,661	1,529	5,332	3,925	557	335	4,817	10,149	47
I	D.B. Gupta Road	335	3,119	2,109	5,563	2,367	325	319	3,011	8,574	35
J	Thomson Road	161	1,825	730	2,716	1,486	45	8	1,539	4,255	36
K	J.L. Nehru Marg	311	2,841	1,948	5,100	996	5	2	1,003	6,103	16
L	B.S. Zaffar Marg	584	3,810	2,614	7,008	3,081	8	13	3,102	10,110	31
M	J.L. Nehru Marg	137	2,144	358	2,639	938	76	19	1,033	3,672	28
N	Joining Subash Marg to Ring Road	42	446	315	803	828	—	34	862	1,665	52
O	Jamuna Bridge Road	284	2,152	822	3,258	2,258	20	24	2,302	5,560	41

9

Water Supply and Urban Administration

The United Nations in its second development decade (1971-1980) programme carried out a survey through World Health Organisation to assess the availability of potable water in its member countries in the year 1970 and then to make proposals for its augmentation through a period of one decade. It was proposed:

1. To increase the percentage of urban dwellers supplied with piped water in their houses or courtyards from 25 per cent to 40 per cent.
2. To increase the percentage of towns people receiving water from public stand pipes from 26 per cent to 60 per cent.
3. To increase the percentage of rural inhabitants supplied with safe water from less than 10 per cent to at least 20 per cent.

To achieve these objectives in only those countries which were members of United Nations at the time of Survey, the estimated cost for such augmentation worked out to be over 9 thousand million U.S. dollars. This would cover nearly 3/4th of the world population and 1/6th of the cost was required for rural improvements and the rest 5/6th for urban population.¹

These figures were worked out over six years ago and considering the inflation the world has seen since then and many approximations which such global estimates have to make, the actual figure would be much higher. It is needless to add that such high sums would be impossible to muster in spite of massive aids which international organisations might make.

The restraint of finance, however, is only one of the many difficulties which the developing countries face. Lack of appropriate legislation, inadequate organizational set-up, paucity of trained personnel and absence of proper planning at national, regional and local levels are some of the many other factors which make it difficult to achieve the objective of making potable water available to citizens at a reasonable price.

Before we come to the complex question of urban administration for water

¹W.E. Wood, "Water Supply as a World Problem", Second International Conference on Environmental Health Engineering in Hot Climates and Developing Countries, 21-24 September, 1975.

supply, let us examine and see as to what are the requirements of a successful water supply system. These can be summarised as:

1. An adequate and continuous source for supply of water.
2. Appropriate installations to collect and purify or process the water.
3. A proper delivery system.
4. An efficient organization to:
 - (a) Plan,
 - (b) finance,
 - (c) erect,
 - (d) operate, and
 - (e) manage the supply.

As can be seen, it is number 4, *i.e.*, the 'organisation' which automatically takes care of the first three requirements also and unfortunately this is the most neglected one.

In a political system like the one prevailing in our country, the most important factor to consider should be the consumer. Even though we always talk about the common man and the weaker section, unfortunately that is one category that is always left out whether we plan our roads or housing or water supply. Every one on this earth has a water supply of some kind or another, otherwise survival would be impossible. It is possible that the supply one has, may not be safe or may be available at an inconvenient distance or insufficient or all those. It is, therefore, essential that the consumer should be consulted and taken into confidence about the type of water supply, its price, its forms of supply, etc., because if the same is not suited to him he will only revert to his old source of supply. It is also true that the consumer considers water as the 'free gift of God' and finds little justification for paying for the same. It has to be explained to him that it is not the water for which he is paying but he is paying for its extraction, for its treatment and its conveyance to a point of consumption. It is mainly due to this reason of taking the consumer into confidence that a good case is made out for a water supply organisation to be with the City Government because it is felt that it is through the elected city fathers that one can have a successful dialogue with the citizens. Besides the consumer, however, are the community uses of water, *e.g.*, its use for fire fighting, its use in hospitals, schools, street cleaning, etc. There are many other uses like commercial, industrial and agricultural which besides economic importance of an urban area can play a useful role in pricing pattern also. In other words it is not only the consumer or the citizen who is required to be consulted on such projects but the city government, who may not be adequately prepared to run a plant, leaving aside the question of erecting a plant, which should be involved in all aspects of such projects before they become custodians of such installations.

Whereas civic pride in owning and running such projects along with 'consumer consultation' are the factors which indicate civic organization's shouldering the responsibility for water supply schemes—there are other important factors which cannot be lost sight of. Let us, therefore, examine water supply as a national subject and list the factors that would support this idea. These would be:

1. National Governments could standardise the projects which can result in large economies both in installation and maintenance.
2. It will also result in standardisation of plants and equipment as well as techniques to be employed.
3. National Water Supply Plans could list out priorities on more realistic and equitable basis and distribute limited finance to achieve best possible results.
4. Technical Training Programmes to make available required number of technicians, their assessments and limitations could be drawn up.
5. The involvement of national government in respect of installation capital is almost invariably there in form of loans, grants and guarantees.
6. International agencies provide aids only through the national government or require their backing.
7. For getting loans, grants and assistance from world bodies like 'World Bank', etc., complex project reports are required to be framed with considerable amount of background information concerning not only technical details of the project but also economic and financial conditions within the country and details as to how the investment is to be protected and loan repayments are required to be guaranteed. The donor countries invariably work through recipient Government rather than municipalities and local bodies. It would thus be seen that there is quite a strong case for water supply projects to be undertaken by the National Government.
8. Finally it may be mentioned that the aspect of 'maintenance' is almost invariably neglected. The maintenance costs, personnel requirements, spares, waste detection, etc., are never worked out realistically. It is often considered as a small routine matter fit to be carried out by a local body. This is not so. It is only with proper and adequate maintenance that a 'continuous' water supply can be maintained and it is often the neglect in this direction that results in extra costs for tapping additional sources of water supply. Paucity of trained staff and handling of system by wrong type of personnel at local level often results in heavy losses. Often same people who are themselves inadequately trained, train others and do all the wrong things.

The community water supply situation in developing countries, specially

in its urban areas is expected to deteriorate due to many factors. The picture as forecast is detailed in Fig. 9.1.

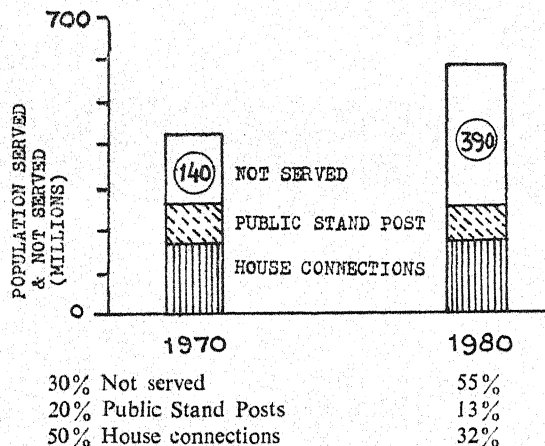


Fig. 9.1. Community Water Supply in Developing Countries

The projections given above only go to strengthen the need for handling the situation at a national level.

In his paper on "A Special Agency for Water Supply—Pros and Cons" by Mohit Bhattacharya, presented in a seminar on Problems of Management and Financing Water Supply at Lucknow University during February 1969, the picture of percentage of population so served by Urban Water Supply System is equally dismal. This is in spite of the fact that the Union Ministry of Health launched a National Water Supply and Sanitation Programme as far back as 1954 as part of Plan Health Scheme. The reason is perhaps mainly due to the fact that water supply falls constitutionally within the competence of State Governments and under the municipal acts of different States, the municipal corporations and municipalities have been entrusted with the task of providing water supply. The municipal corporations and municipalities are ill-equipped to perform the essential functions listed in this paper. The solution, therefore, it seems lies in tackling this problem at the National Government level through specially created agencies.

²J.M.G. Van Damme, "Needs and Problems in Water Supply in Developing Countries", Loughborough University Conference, Sept., 1973.

10

Gangtok **A Study in Development Planning***

The town of Gangtok and its neighbourhood have been growing at a very rapid rate but without a plan. The haphazard growth brought with it all the evils of unplanned urbanisation. To correct the situation, the Government of Sikkim had suspended building activity in the entire Gangtok town area. This paper provides a basis for the organised development of the town and to ensure basic civic services and amenities for a period of approximately 30 years.

THE PLANNING AREA

The development plan covers an area of 2000 hectares. Though the land use control would be effective only in the proposed urban area which is broadly bounded by the proposed bye-pass road in the West leading to Penlang La, bye-pass road in the East leading to Nathula, the Cantonment area at Tadong in the South and the Bhurtuk and India House area in the North, the Planning controls would, however, be applicable to the entire planning area which is bounded by Roro Chhu in the South-East, Rongni Chhu in the West, Bhurtuk area in the North. Outside the proposed urban limits, the area has been designated as agricultural green and it is suggested that no urban development should be permitted in that area. It may be mentioned here that in the overall development plan, the areas presently occupied by the new Cantonment at Tadong, the old Cantonment near Bhurtuk and the estate of India House have been retained as reserved areas. No proposals with respect to detailed land use, etc., within these areas have been suggested in the development plan. It is assumed that adequate care would be taken by the respective authorities for the detailed planning of these areas. The total reserved area is 220 hectares.

THE OBJECTIVES OF THE DEVELOPMENT PLAN

The comprehensive development plans have been drawn up to ensure that

* This paper was prepared by S/Shri H.U. Bijlani, D.D. Mathur and S.S. Ramarakhyani at the request of Sikkim Government. The request was received through the Ministry of External Affairs in the Government of India, during 1973.

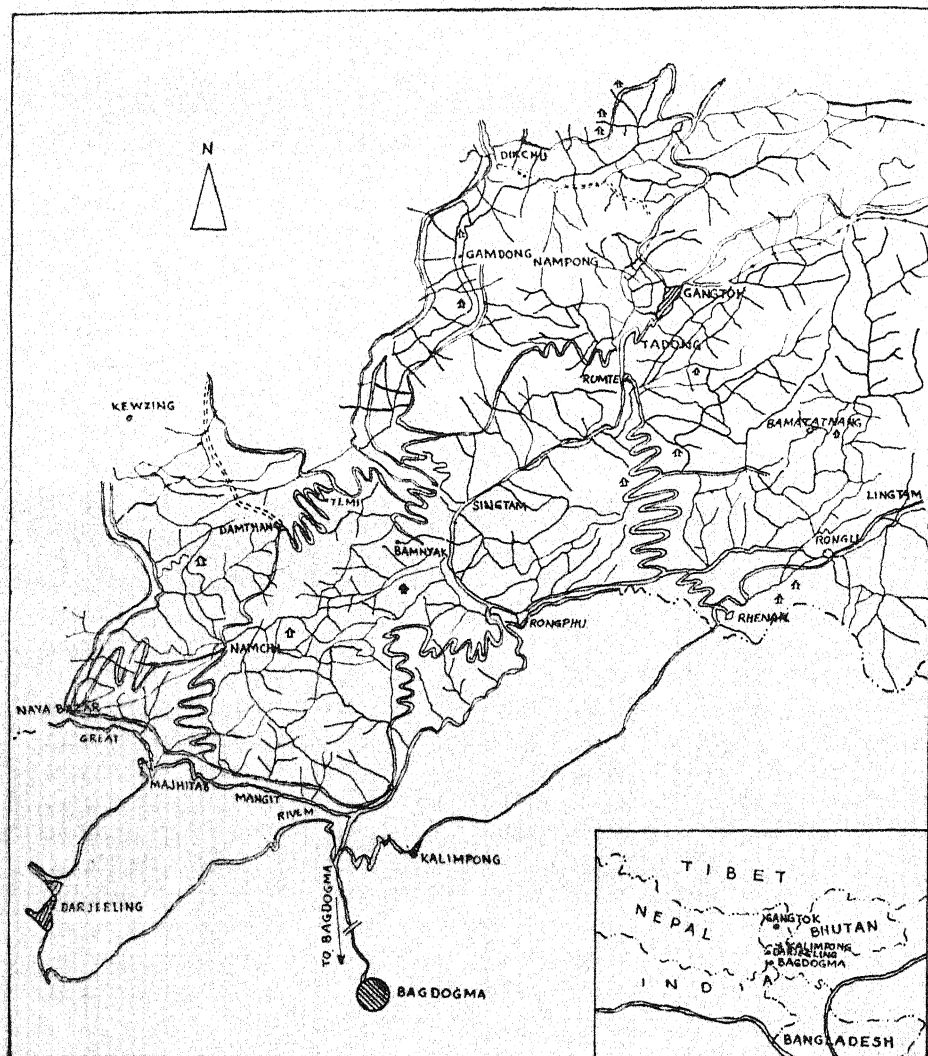


Fig. 10.1. Regional Location

the following functions are achieved:

- (i) To secure and promote the development of Gangtok urban area according to a plan.
- (ii) To serve as a basis for a broad programme and policy for the development of the area or parts thereof to secure health, safety, convenience and welfare of the inhabitants of the area.
- (iii) To suggest solutions of urgent problems and to dovetail the project plans of immediate nature so that the same could be fitted into the comprehensive development plan.
- (iv) To advise the Sikkim Government on the Administrative and other steps necessary for the regulation and control of land uses and other matters concerned with the preparation of the comprehensive Plan.
- (v) To advise the Sikkim Government on the administrative, financial and other measures necessary to implement and enforce the proposed development plan and the detailed comprehensive schemes after their completion.

THE DEVELOPMENT PLAN

Under the above concept, the development plan is neither a project plan nor a blue print for actual execution. Rather it should be regarded as a statement of growth objectives, policies and principles and as locational and spatial inter-relationships in the form of plan maps. It is from such a plan that detailed programmes and blue prints for plan implementation should be subsequently drawn up in logical manner. The development plan, therefore, provides for:

- (i) The outline of environment deemed most desirable for the various activities of the community and its surrounding area.
- (ii) Serve as the basis for more detailed studies for planning specific areas such as central commercial area or problems such as slum clearance, housing and services.
- (iii) A framework for coordination of programmes, plans and projects, which may be in future prepared and executed by the various governmental agencies and private bodies operating within the planning area.
- (iv) The broad guidelines and principles according to which land use and other development controls can be exercised.

THE GANGTOK PLANNING AREA

Gangtok town sprawls over the Western slopes of the hill more than 5000 ft. above the sea level. It is the seat of Sikkim Government and is the major commercial, trade, tourist and cultural centre.

The town is approachable by road, and is connected to the Bag Dogra Air Port and major railway/bus station at Sili Guri. The Sikkim Nationalised Transport runs a passenger bus from Sili Guri Railway Station to Gangtok. Private taxis also ply from Bag Dogra and Sili Guri to Gangtok. The town is also connected with Darjeeling and Kalimpong by an all-weather road. Sikkim Nationalised Transport and private taxis also ply between Gangtok and these towns. It is well connected with the northern Sikkim and the roads to Nathula, Mangan (North Sikkim) pass through the town.

CLIMATE AND PHYSICAL CHARACTER

The climate of Gangtok is pleasant throughout the year. The maximum monthly mean temperature in August is 23.3°C and the minimum monthly mean temperature during the month of January is 4°C . Humidity is fairly high throughout the year and the maximum rainfall is recorded through June to September. The period from October to April is fairly dry and the best season for tourists is in April to June and again from October to December. The months of January and February are rather chilly.

The Gangtok town spreading from Tatang to Bhurtak along the Western slopes of the hill is located at a height between 1200 meters and 1700 meters. A number of jhoras and rivulets with their tributaries flow through the planning area. The important rivulets are Roro Chhu in the East and Rongni Chhu in the West. These rivulets join at Rani Pul and are ultimately drained into Tiesta river at Singtan. These rivulets are quite shallow but water runs through them perennially. In the monsoon season, however, they swell beyond their banks.

In the north of Gangtok town, there are hills which gradually rise up leading to the ranges of Kanchen Junga which are located towards the north-west of Gangtok, the third highest mountain in the world. The land on the lower slopes of the hills below the Gangtok town towards the Rongni Chhu is fertile agricultural land producing paddy, vegetables and other crops. The lower hill slopes towards Roro Chhu are rather steep and, as such, are not good for cultivation.

POPULATION

The total population of Sikkim according to 1961 census was 162,189 which increased to 208,609 by 1971. As such, there was an overall increase of about 46,420 over a period of one decade resulting in approximately 28 per cent increase. Compared with this, the population of Gangtok town increased from 6,848 in the year 1961 to 12,646 in the year 1971 resulting in an increase of approximately 90 per cent growth rate. It may be observed here that in Sikkim, Gangtok, the capital town is the only sizable urban area and there has been considerable migration of population to the Gangtok town

from the surrounding rural areas. This has happened on account of various factors such as better job opportunities and educational, trade and other facilities, which normally are not available in villages and smaller towns, etc.

The growth of population in Sikkim since 1901 is given in Table 10.1. Growth of population in Gangtok has also been shown in the same table. Based on past trends, population projections for the entire Sikkim and that for Gangtok town have been made for the next 30 years which are clearly indicated in Fig. 10.2. Taking the lower rate of growth for population, it is expected that by the year 2003 (*i.e.*, 30 years hence), the total population of Sikkim would be approximately 270,000 whereas taking the higher rate of growth, it would be approximately 310,000. Similarly, taking into consideration the fast rate of growth of Gangtok town, and the importance attached to this town, being the capital of Sikkim, it is estimated that the population of Gangtok would be increased to about 35,000 taking the lower rate of growth whereas it may reach a maximum figure of approximately 45,000 taking a higher rate of growth. For planning purposes, it will be safe to take 40,000 population for Gangtok town by the year 2003.

There are two major Cantonment areas located at Gangtok. One at Tadong where a new Cantonment has recently been developed and the other at Bhurtuk which was developed some years ago. The population of the military personnel residing in these cantonments has not been taken into account towards the total population of Gangtok. It is expected that in the years to come, these two Cantonments would remain to continue as Cantonments and the civilian population attached to Cantonment establishments is also likely to increase. Whereas Cantonment Board authorities do provide for adequate community facilities such as schools, etc., while planning the Cantonment areas, the facilities such as shopping, cultural and transport for the civilian population cannot be fully provided for within the Cantonment areas. It is, therefore, considered that while planning for the community facilities specially the shopping facilities and cultural and transport facilities, an additional population of about 5,000 be added to the population of Gangtok town. It would only be fair, therefore, to assume that by the year 2003, the population of Gangtok would be 45,000 for the purposes of making assessment for the requirements of community facilities, etc.

TOURIST TRADE

Gangtok is one of the most important tourist centres in Sikkim. The town is ideally located from the tourists interest point of view and there are many places worth visiting within the town and in its vicinity. The major tourist's attraction centres are, the Chogyal's Palace, Royal Chappel—Tsuklakhang, the Namgyal Institute of Tibetology, Enchen Monastery, Orchid Century, Deer Park, etc. Famous Rumtek Monastery which is approachable by road from Rani Pul is another important place for sight-seeing and visiting. The most

Table 10.1
POPULATION GROWTH AND PROJECTION

Year	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001	2003
SIKKIM												
Population	59,014	87,920	81,721	109,808	1,21,520	137,725	162,189	208,609	222,000	244,000	266,000	270,000
Percentage increase/decrease per decade.	+48.98	-7.05	+34.37	+10.67	+13.34	+17.76			234,000	268,000	302,000	310,000
GANGTOK TOWN												
Population					6,848*	12,646			19,900	26,500	33,750	35,000
Percentage increase						85.			22,500	32,500	43,000	45,000

* Population figures taken from Census of India, 1961-77.

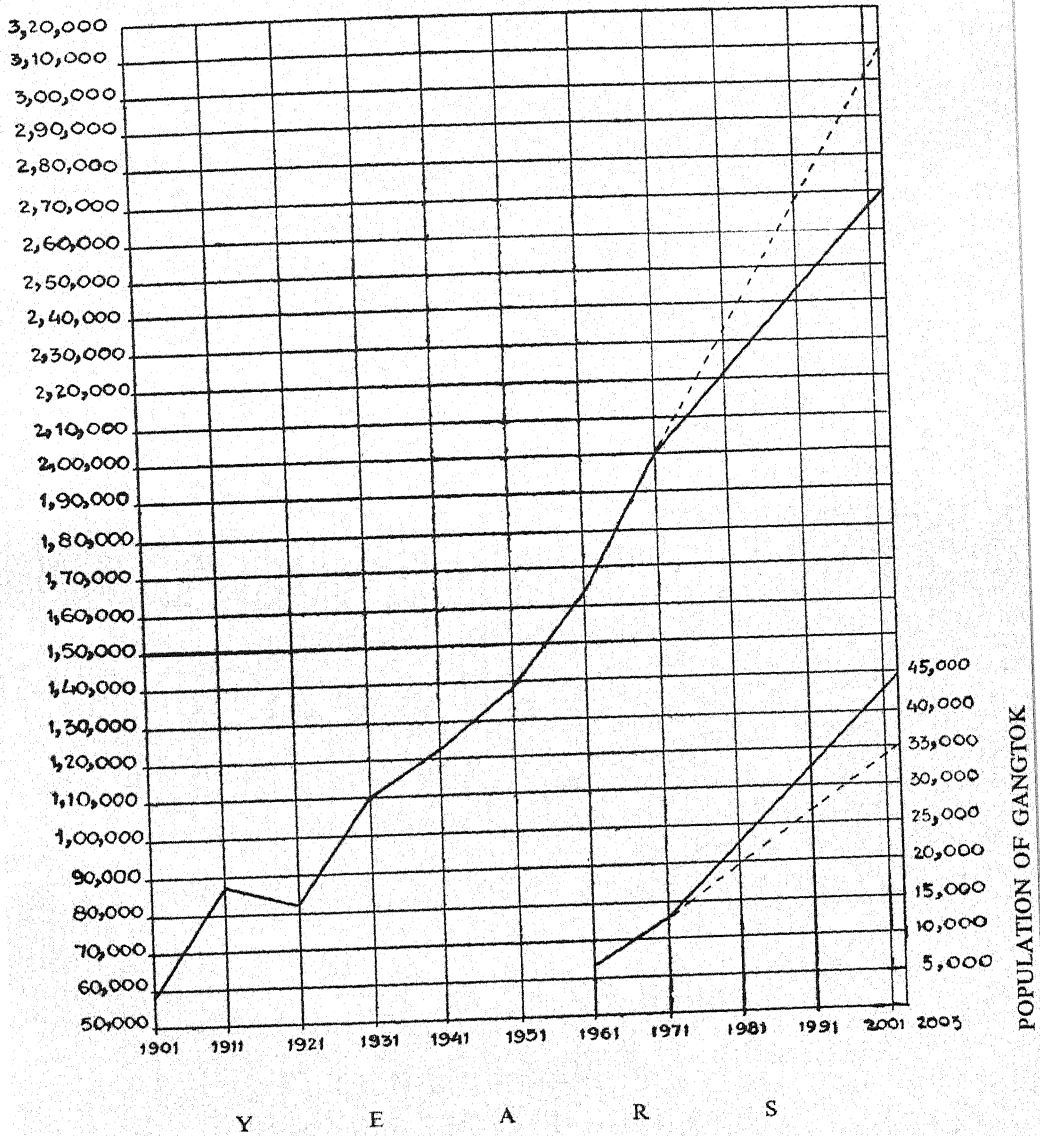


Fig 10.2. Population Growth

important attraction, however, is the view of Kanchen Junga, the world's third Snow-peak Mountain which is clearly visible from this town on clear days. Darjeeling and Kalimpong, two major tourist attraction towns, are located within 70 kilometers of Gangtok. Since Gangtok is well connected by road to the Northern parts of Sikkim, namely, Mangan, Lachen, Nathula, etc., it served as a base centre for the tourists who are interested in high mountain trekking, etc. There are many lakes, beauty spots and high mountain peaks within the close vicinity of Gangtok town.

Only recently, Gangtok has assumed importance as a tourist centre. Before the year 1968, hardly any tourist visited Gangtok. During the year 1969-70, the number of tourists increased to 1000 and has gradually gone up to a figure of 2000 during the year 1973-74 (A number of foreign tourists who wished to visit Gangtok during the year 1973-74 could not do so as adequate facilities in the hotel and guest houses was not available). It is expected that in the next 5 years, the number of tourists visiting Gangtok would increase to 6,000 per year. Tourists visiting Gangtok are mostly under Package Tour Programmes and the majority of the tourists are from European and other Western countries. The recent construction of Farraka Barrage, however, is likely to encourage tourists from India, specially from West Bengal to visit Gangtok as direct access road is now available between West Bengal and Sikkim.

Presently, there is only one good hotel (Norkhill Hotel) and Government guest houses which provide for reasonable facilities for the tourists. There are a few inexpensive hotels in the Bazaar area which mostly cater to the needs of the business community, etc. There is an urgent need to provide for additional good hotels, cottages and other tourist facilities at Gangtok to cater to the needs of the increased tourist traffic in future. The Bazaar and the shops are mostly catering to the needs of the local population and the adjoining hill areas. There are no coffee shops, restaurants and good emporia where foreign tourist could make purchases and eat comfortably. As such, it would be necessary that apart from providing additional hotels, cottages and rest houses, facilities such as coffee bars, restaurants, shopping centres and emporia are developed in Gangtok. It would also be necessary to develop parks and gardens (there are none as yet) for picnics, etc. There are many good spots which can be developed and can serve the purpose of outdoor recreational facilities for the local population also.

COMMUNITY FACILITIES

Education

The literacy according to 1961 Census for the whole of the Sikkim was 12.3 per cent and as per 1971 Census, it was 13.3 per cent whereas for the Gangtok area, the literacy according to 1961 Census was 40.6 per cent and

according to 1971 Census, it was 45.45 per cent. It may be noted that the low rate of literacy in Sikkim is due to the fact that a large section of the population resides in rural areas and it is predominantly an agricultural state. It is rather alarming to note that the rate of literacy in rural areas was only 11.1 per cent in 1961 and only 3.2 per cent of the women-folks were literate. Though the figures for Gangtok area compare favourably with that of the Sikkim State, concerted effort is required in this direction. The Gangtok town has the largest number of primary and secondary schools in the State. There are five higher secondary schools which also cater for the primary education and there are five exclusive primary schools within the Gangtok Planning area. The total number of students attending the primary classes in the primary sections of the higher secondary schools and the exclusive primary schools is presently 2,878. The number of secondary school students between the age group of 12 to 17 is 1,395. Table 10.2 gives details of the primary and higher secondary schools and the strength of students. It is clear from the figures in the table that the West Point School which is presently running in three shifts is catering to a very large section of the population of Gangtok and it appears, the population concentrated in the Bazaar area and in its vicinity is served by the West Point Primary School as far as the primary

Table 10-2
EXISTING EDUCATIONAL FACILITIES

<i>Educational Institution</i>	<i>Age Group 6 to 11</i>	<i>Age Group 12 to 17</i>	<i>Total No. of Students</i>
1. T.N. Academy	202	102	304
2. T.N. Higher Secondary School	234	349	583
3. P.N. Girls Higher Secondary School	492	329	821
4. Enchey Higher Secondary School	355	83	438
5. West Point School	835	392	1227
6. Tata Chen Primary School	158	29	187
7. Sikkim Guards Primary School	188	32	220
8. Deorali Primary School	82	5	87
9. Tadong Primary School	270	49	319
10. Rongyek Primary School	62	25	87
Total	2878	1395	4273

(Total No. of Higher Sec./Primary Schools= 5)
(Exclusive Primary Schools = 5)

education is concerned. There is, therefore, an urgent need to provide additional primary education facilities in this area.

As far as the secondary education is concerned, it appears, the number of schools presently are adequate. However, for the increasing population, adequate provision would be made in the new residential areas to be developed in future.

Health

There is only one large hospital in Gangtok which is well equipped. It has 272 beds (including the T.B. beds). The hospital also has a separate T.B. Block. There are no other hospitals or dispensaries in Gangtok town except for the medical facilities available to the army personnel in the old cantonment and the new cantonment. It is very necessary to provide for at least small Health Centres and Clinics in the residential areas that are located at a distance from the existing hospitals.

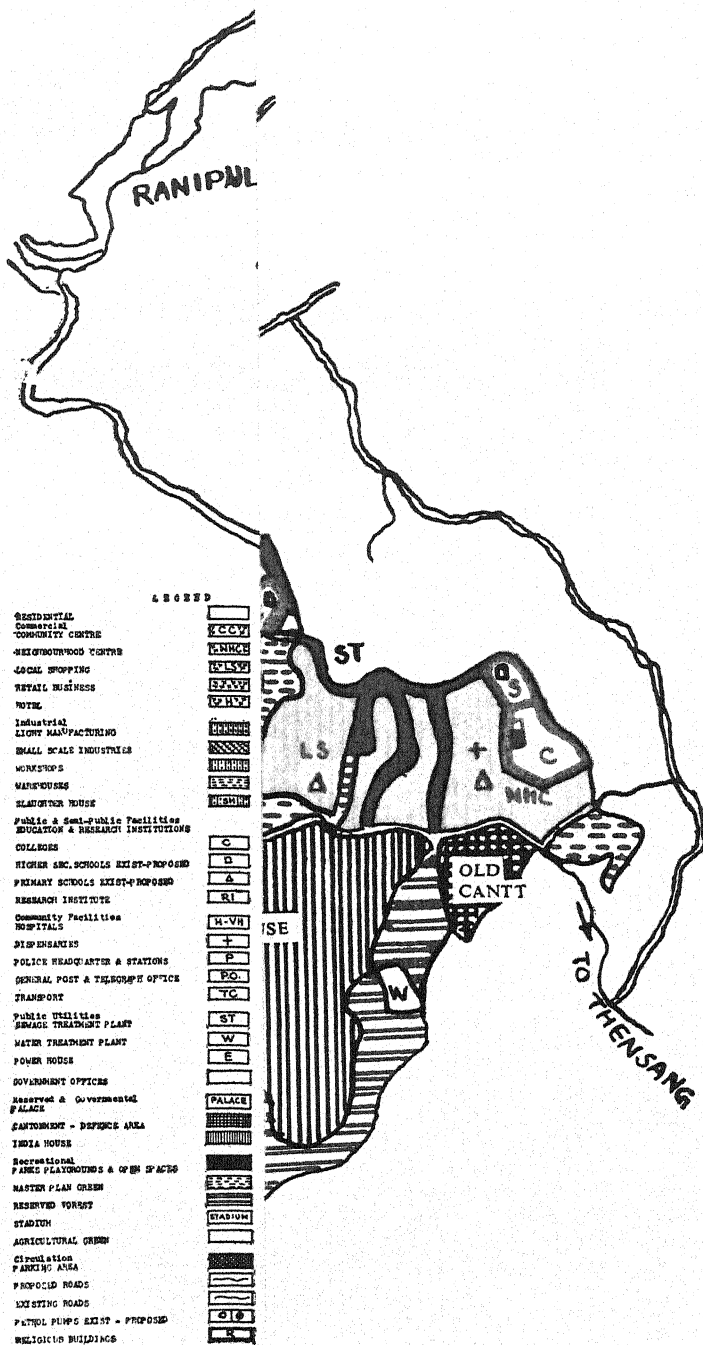
Recreation

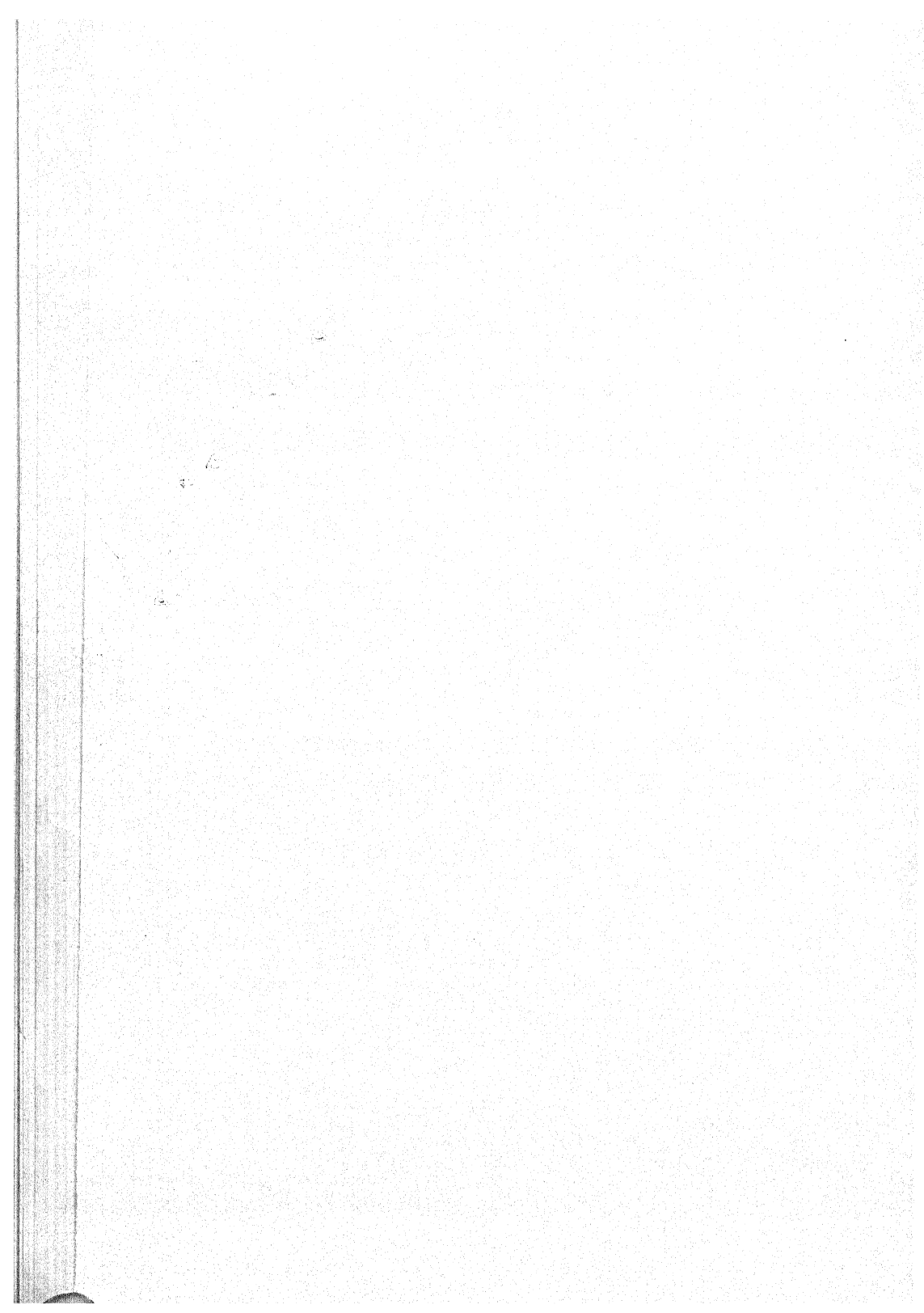
The available public open spaces are rather deficient in Gangtok town. The town suffers from almost total absence of public parks, play grounds and other out-door recreational space. Presently, there is only one large open stadium and a very small children park. Adequate play ground facilities are also not available with the primary and secondary schools. It would be desirable that in future, adequate care is taken to provide for tot-lots and play grounds in the residential areas and adequate play fields are also attached to the educational institutions. The Paljar Stadium which is being utilised for various activities other than recreational, should be exclusively reserved for recreational facilities. The police department should develop a separate parade ground.

Apart from the inadequacy of play grounds, play fields, there is lack of properly developed picnic spots in Gangtok. The development of well planned picnic spots at suitable places would considerably help in providing additional facilities which may be a source of tourist attraction as well.

Development Plan for the Gangtok Planning Area

The development plan has been prepared for an estimated population of about 45,000 by the year 2003. While formulating the plan, factors such as existing regional and local setting have been taken into account. Geographical and socio-economic factors that have resulted in the existing physical form of the town have also been considered and the development plan has been conceived and is based upon the knowledge gained through the data collected and the actual field surveys and site inspections.





The major policy recommendations of the plan are :

- (i) The urban population of 45,000 (by 2003) in Gangtok town will retain the desired open residential character and also provide for the benefits of planned urban development.
- (ii) The aesthetic quality of certain important public and governmental buildings including the Palace will be preserved. The natural topographical features of the hilly terrain and the existing forest areas are to be fully made use of to retain the pleasant character and quality of life for this capital city which also has an importance as a major tourist centre.
- (iii) The town would retain its major character as an administrative, social, cultural and educational centre for the state of Sikkim. However, adequate provision for service industries and commercial activity would also be provided to broaden its economic base and provide for adequate employment opportunities for its growing population.
- (iv) The area, outside the planning area, falling between the Rongni Chhu and the proposed bye-pass road in the west of the town and the area between the Roru Chhu and the proposed bye-pass road towards the east of the town would continue to be utilised for agricultural land and pasture land will be preserved around the planning area.

MAJOR ELEMENTS OF THE PLAN

Land Use

The proposed land use forms the most important element of the development plan. The characteristics of the town and the directions of the development would mainly be determined by the land use plan. The suggested land use for the Gangtok town indicates the requirements of land for residential, commercial, industrial, recreational and community facilities uses. The plan also indicates the relationship between the various uses. Though the exact location of the various community facilities in the proposed residential areas has not been indicated on the land use plan, their notional location clearly lays down the principles on the basis of which their precise location could be worked out while preparing detailed layout plans for individual areas.

The estimates of the land required for various uses are based upon the population projections. Care has also been taken to make use of the pockets of un-utilised land which is extensively available in certain sections of existing residential areas which could be profitably utilised for housing additional population.

The break-up of existing and proposed land use is given in Table 10.3.

Table 10.3
BREAK-UP OF EXISTING AND PROPOSED LAND USE—GANGTOK
PLANNING AREA

<i>Use Category</i>	<i>Existing Area (Hectares)</i>	<i>Proposed Area (Hectares)</i>	<i>Total Area (Hectares)</i>
1. Residential	119.50	100.50	220.00
2. Commercial	12.50	12.50	25.00
3. Industrial	1.00	31.00	32.00
4. Public and Semi-public facilities:			
(i) Colleges	—	4.00	4.00
(ii) Technical Institute	1.00	0.25	1.25
(iii) Higher Secondary Schools	15.4	12.00	27.40
(iv) Primary Schools	0.70	5.50	6.20
(v) Hospitals/Dispensaries	4.00	1.70	5.70
(vi) Police Headquarters & Stations	0.5	2.00	2.50
(vii) Post & Telegraph Offices	0.60	—	0.60
5. Governmental & Reserved areas:			
(i) India House	118.00 (Approx.)	—	118.00
(ii) Area under old and new Cantonment	95.00	—	95.00
(iii) Sikkim Guards	7.50	—	7.50
6. Recreational			
(i) Reserved Forest	58.00	—	58.00
(ii) Master Plan Green (Reserved area)	—	117.00	117.00
(iii) Area under Parks & Play Grounds	2.00	50.00	52.00
7. Agricultural Green & Misc.	—	—	1238.35
8. Total Planning Area			2003.00

Residential

The total of 220 hectares have been earmarked for residential use. As already mentioned earlier, the plan only indicates, in general terms, the area allotted for residential purposes and while preparing detailed plans, adequate care shall have to be taken that facilities such as tot-lots, parks, neighbourhood centres, primary schools and local shopping areas are also planned as an integrated part of residential neighbourhoods.

The new proposed residential areas have been mainly located between the proposed bye-pass road in the West and the existing development. The major residential development, as such, would take place in Bhurtuk area, the area lying below and in the North-west of Enchey Higher Secondary School below the Paljar stadium and the West Point School. Adequate additional residential area has also been proposed towards the west of Tadong Cantonment adjoining the proposed industrial area.

It is also proposed that the existing residential complex of the Forest Department which is very thinly built, may provide for additional housing facilities.

Commercial

The commercial activity is presently confined to the main bazaar area which has been planned as a traditional bazaar on either side of a road without any proper facilities for parking, loading and unloading of goods and segregation of pedestrian and vehicular traffic. Sunday Bazaar popularly known as Lal Bazaar serves as a fruit and vegetable market, and meat market not only for the Gangtok town but for the surrounding small towns and the villages.

Facilities such as banks, cinemas, wholesale and retail shops, and other allied activities are located in the Main Bazaar area, and the Lal Bazaar area.

The situation is further aggravated on account of location of Sikkim Nationalised Transport, goods and passenger booking offices in this area. The trucks and buses of the Sikkim Nationalised Transport are parked near the entry to the Main Bazaar which apart from being unsightly are a source of traffic hazard and pollution.

Apart from the Main Bazaar area, there is an existing bazaar at Deorali and at Tadong. It is proposed to retain the present Main Bazaar area, the Lal Bazaar and the markets at Deorali and Tadong. These markets, however, would require considerable improvement facilities for parking, etc. It is also suggested that a proper comprehensive redevelopment plan for the existing market areas is prepared to control the development of these areas so as to avoid further congestion in these markets. It would be also necessary to prescribe architectural control over the construction of buildings in these market areas. All these measures are necessary not only to ensure planned development of these markets in future but also to create aesthetically satisfying environment which is essential for creating proper atmosphere for the commercial, cultural and social activities.

It is also proposed that 4 new Neighbourhood Centres are developed in the proposed residential areas. Each Neighbourhood Centre would have approximately one hectare area and would provide for 15 to 20 large and medium sized shops with a number of small shops for fruit and vegetable sellers, facilities such as post office, telegraph office, police station and community halls, etc. The existing markets at Deorali and Tadong have also been designated as Neighbourhood Shopping Centres and it is suggested that facilities such as community hall, police station, post and telegraph offices may be suitably located in these existing centres.

It has also been proposed to locate local shopping centres comprising of 6 to 8 small shops in the new residential areas and the areas proposed to be

redeveloped. Their approximate locations have been indicated on the land use plan. The local shopping centres would have areas varying between 0.25 hectares to 0.5 hectares.

The Sunday Bazaar (Lal Bazaar) would also require proper re-planning and adequate provision for parking.

Table 10.4

SHOPPING FACILITIES IN THE GANGTOK PLANNING AREA

<i>Type of shopping facilities</i>	<i>Existing</i>	<i>Additional proposed</i>	<i>Total at the end of the Master Plan Period</i>
1. Main Market (Retail business)	1	Nil	1
2. Community Centre	Nil	1	1
3. Neighbourhood Shopping Centre	2	4	6
4. Local shopping	Nil	6	6

1. There is an existing major Post & Telegraphs Office which is proposed to be retained. Small Post & Telegraph Offices should come up in the proposed/existing Neighbourhood Shopping Centres.
2. There is an existing Police Station and it is proposed to retain the Police Station and Fire Station at the existing site. However, a major Police Station/Police Lines area has been suggested near the existing Paljar Stadium. Small Police Stations/Chowkies could be located in the new/existing Neighbourhood Centres.
3. There are already two existing Cinemas in the Main Market area. Additional Cinemas, if required, may be located in the proposed community centre area.
4. There is an existing community hall which is proposed to be retained as part of the proposed Community Centre.

Industrial

Presently there are no industries located within the Gangtok town. A jewel bearing factory is under construction between Deorali and Tadong and a transistor factory is running in a small building between Deorali and Gangtok. It would be undesirable to locate any large industrial units in the Gangtok Planning Area. Development of a large industrial complex would not only undermine the importance of Gangtok town as a state capital and centre of cultural, social and educational activity but would also create problems of housing, congestion and pollution, etc. The location of large industries in Sikkim should be considered in the regional context taking into account the availability of power, raw materials, labour force, etc. It would be more desirable to locate larger industrial units at Singtam and Rongphu. An industrial complex could also be developed on the new road that is under

construction from Rani Pul to the Lagyap project. However, to meet the requirements of the small scale industries and the service industries, an industrial complex has been planned at Tadong which would have a total area of 32 hectares. It is proposed that the large area lying under-utilised at the dairy farm at Tadong is developed for service industries/small scale industries. The existing buildings and sheds of the dairy farm could be subsequently utilised in the 2nd phase for the establishment of small scale industries. It is proposed that in the Light Industries area as well as Small Scale Industries/Service Industries area, industrial units employing more than 20 workers be not permitted and preferably located outside the Gangtok Planning Area. A site for the workshop of the Sikkim Nationalised Transport has also been suggested adjoining the proposed industrial complex within the present site of the dairy farm. It is proposed that the major activities of the Sikkim Nationalised Transport are shifted to the new proposed site in phases.

It is suggested that adequate industrial housing is developed in the adjoining residential areas for housing the industrial workers who would be employed in the New Industrial Complex. The S.N.T. Colony near Deorali could be further expanded to provide for more housing facilities for the S.N.T. Workshop employees which is proposed to be located as mentioned earlier adjoining to the industrial complex.

Offices and Administrative Buildings

The major government office complex would continue to remain at the present site located to the South of the Palace. As already proposed, the new secretariate building would also be located at this site. It is suggested that in due course of time, High Court and the Council House are also shifted to this site. It would be desirable to shift the existing Sikkim P.W.D. Offices to this complex and the space vacated by the Sikkim P.W.D. may be made available to the Technical Institute for its expansion programme. It is also suggested that the Chief Administrator's office is shifted to the new Government Offices complex and the present building is utilised as a hotel for which it was originally designed.

Recreation

Development of recreational areas in the form of parks, play grounds and for out-door recreational facilities should be taken up simultaneously with the development of new residential areas. The land use plan indicates a total area of 230 hectares for recreational use. The areas shown for parks, play fields, district parks and open spaces (Master Plan Green) should be kept free from any construction and should be developed primarily as open spaces. In the residential areas, small tot-lots and play fields shall have to be developed at appropriate locations. These small tot-lots and play fields should be planned

as an integral part of the housing schemes. The same have not been shown in the land use plan. It would be desirable that while preparing detailed layout plans, approximately 10 to 15 per cent of the area is reserved for tot-lots and play fields. The tot-lots and the play fields would serve as play areas for small children.

Tourist Trade

In the preceding paragraphs, the question regarding development of tourist trade has already been discussed in detail. To provide for extra tourist facilities, provision has been made for two new hotel sites in the Master Plan. It is proposed that the existing jail which is housed in very old buildings is shifted to a suitable location outside Gangtok town and the site developed for a hotel. It would be preferable that instead of construction of a multi-storeyed hotel building, small one room and two room cottages are constructed at this site. A portion of a site at the ridge should also be developed as suggested in the Master Plan as a well laid-out garden to serve as a picnic spot for tourists as well as local population. This site would provide a commanding view of the Kanchen Janga range and also of the existing town that sprawls on the Western side of the hill below. Another site has been suggested to the south-west of palace area on the road that extends beyond the bazaar. This site would be ideal for construction of a multi-storeyed hotel building to serve the needs of tourists coming from India and neighbouring countries.

The present site of the Norkhil Hotel is sufficiently large and additional rooms could be added to the existing building. It may also be possible to acquire some of the residential houses towards the East of the Norkhil Hotel which could be converted into cottages with suitable modifications.

Apart from construction of new hotels, it would be necessary to develop a number of picnic spots and facilities for shopping specially for foreign tourists. As such, it would be very necessary that adequate facilities such as new shopping complex, emporia, banks, information centres, etc., are provided in the proposed complex of the community centre that has been suggested to be developed at the present site of the Sikkim Nationalised Transport workshop offices. This site is ideally situated as the same is centrally located and would be easily accessible from the proposed transport centre's site and existing market. This complex would become even more attractive if the existing community hall which is located adjacent to the S.N.T. Workshop is re-modelled to cater for multiple functions. The hall with suitable modifications would be utilised as a skating rink and for cultural programmes. It may also be utilised for screening films, etc.

COMMUNITY FACILITIES

Various community facilities that are existing in Gangtok town have already been discussed earlier. The proposed sites in the community facilities

such as schools, colleges, community centres, etc., have been shown in the Master Plan. Precise location of the proposed primary schools, health centres, post and telegraph offices and new police stations have not been indicated on the plan. As far as the location of the primary schools are concerned, their approximate locations have been shown in the new residential areas. The facilities such as police stations, post and telegraph offices are proposed to be located in the new neighbourhood shopping centres. The details regarding various community facilities as proposed in the plan have been discussed in the following paragraphs.

Health Facilities

It is proposed to retain the existing General Hospital at the present site. In the land use plan, it has been suggested that the land of the old residential houses located towards the north-east of the hospital be also made available for the expansion of the hospital. The Sikkim Government has already a programme of shifting the T.B. clinic and hospital to a new site. It would be advisable that the space that would become available on account of shifting of the T.B. Hospital is utilised for the additional facilities of the General Hospital. It is felt that the present hospital not only serves the local population but the entire region. It would be necessary that adequate hospital facilities are provided in the smaller towns so that facilities available at the existing hospital are utilised more efficiently.

Table 10.5

HEALTH FACILITIES IN THE GANGTOK PLANNING AREA

<i>Type of Medical Facilities</i>	<i>No. existing</i>	<i>No. proposed</i>	<i>Total at the end of the Master Plan Period</i>
1. Hospitals public	1	1	2
2. Dispensaries/Health Centres	Nil	4	4
3. Veterinary Hospital	1	Nil	1

The existing hospital also contains the T.B. Clinic and wards, and it has already been decided to construct a new T.B. Hospital outside Gangtok town at Pakyan. As such, when the T.B. wards are shifted, the existing facilities of the General Hospital could be expanded. It has also been proposed to increase the area of the hospital site by utilising certain old existing residential bungalows, etc., in the adjoining area.

In the new residential areas, four new dispensaries and health centres have been suggested. It would be desirable that while preparing detailed

layout plans of the residential areas, health centre sites measuring half hectare are reserved at the locations suggested in the Master Plan.

There is an existing veterinary hospital near Deorali. It is proposed to retain the same.

Education

Requirements of educational facilities have already been discussed earlier. A site measuring 4 hectares for a college has been suggested in Bhurtuk area. Sites for five new higher secondary schools have also been indicated in the Master Plan. It is proposed that the new higher secondary schools should have an approximate area of two hectares.

Nine additional primary schools have been indicated in the land use plan. It is suggested that each primary school site should have an area of 0.75 hectares to 1.0 hectare. Presently there is no provision for nursery education in Gangtok town. It would be desirable to locate (according to the requirements in future) nursery schools in the new residential areas. A creche may also be provided in the new residential area proposed at Tadong which has been mainly suggested for housing the industrial workers.

Table 10.6

NUMBER OF EDUCATIONAL INSTITUTIONS IN THE GANGTOK PLANNING AREA

<i>Type of Educational Institutions</i>	<i>No. Existing</i>	<i>No. Additional Proposed</i>	<i>No. Total at the end of the Master Plan Period</i>
1. Primary Schools	5	9	14
2. Higher Secondary Schools (Including Primary Sections)	5	5	10
3. Colleges	1	1	2
4. Technical Institutions	1	Nil	1
5. University	Nil	1	1

1. According to the existing pattern, primary classes are also attached with the higher secondary schools. As such, in the future also, in 5 additional higher secondary schools, primary sections would also be added.
2. There is no full-fledged existing college in Gangtok. A part-time evening college is being run presently in one of the school buildings. A site measuring about 10 acres for the construction of a college has been proposed in Bhurtuk area.
3. A site for establishment of a University has been selected in Pengyong area.

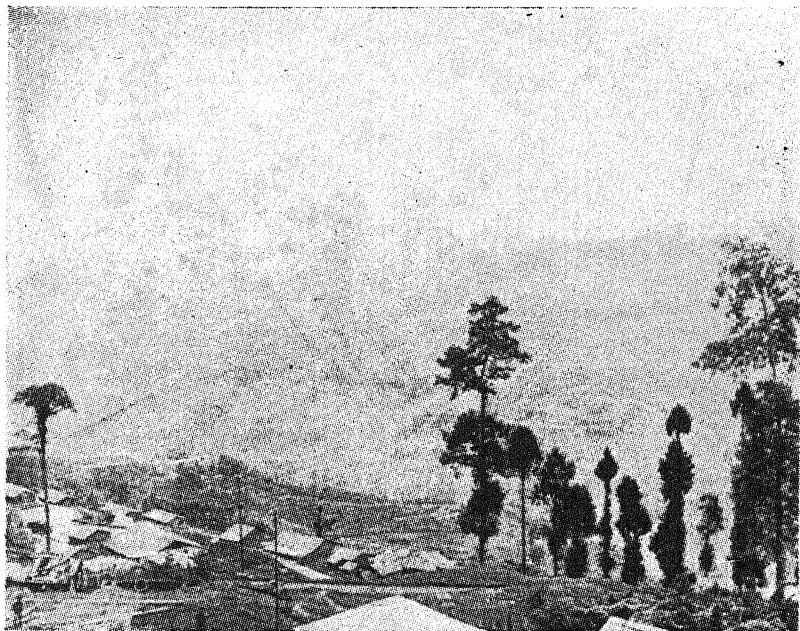


Fig. 10.5. View of Bhurtuk Area—Proposed Residential Development.



Fig. 10.6. Existing Residential Area Between Bazaar and Quazi Road—Proposed for Redevelopment and Improvement.

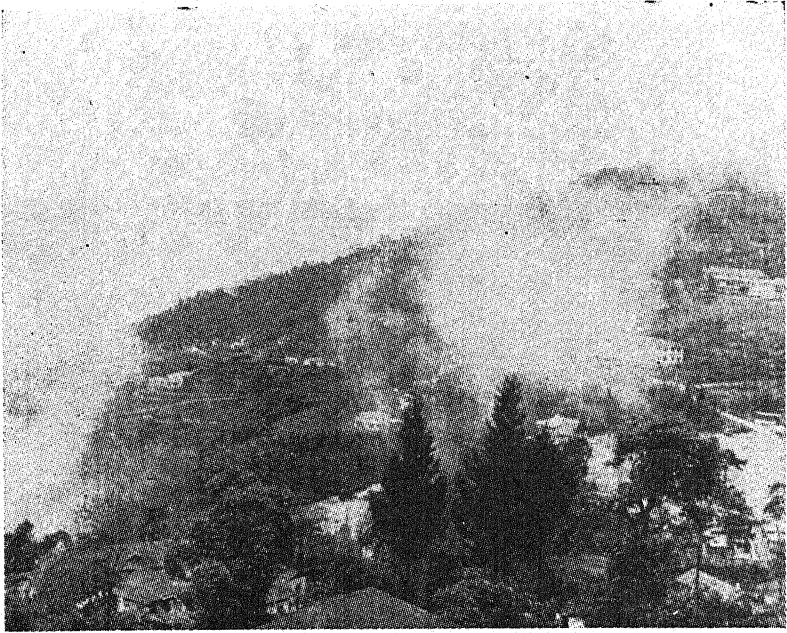


Fig. 10.7. View of Area Around Girls Higher Secondary School—Proposed for Residential Development.



Fig. 10.8. View of Bazaar Area. No Proper Arrangements for Parking.

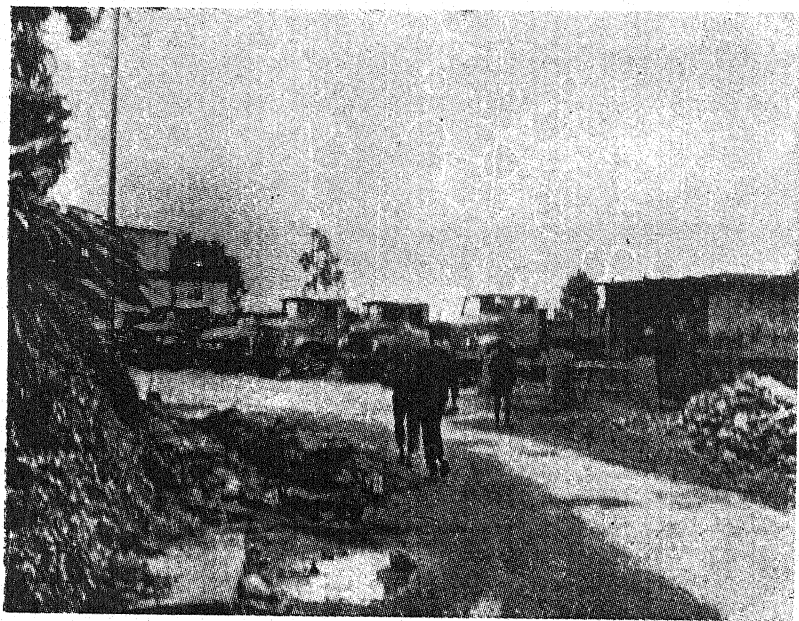


Fig. 10.9. Approach to Bazaar Area. Unsightly and Congested.

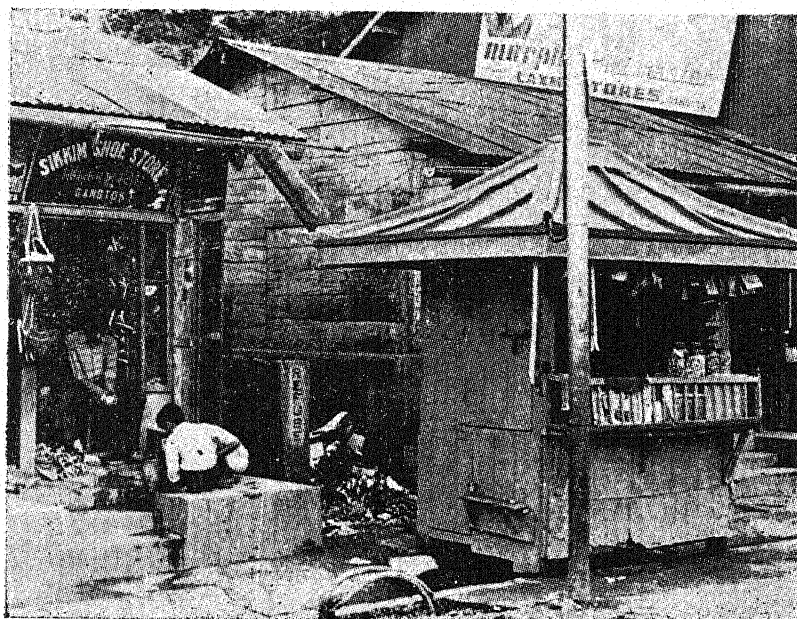


Fig. 10.10. View of Existing Shops and Kiosks in Bazaar Area—Proper Redevelopment Desired.

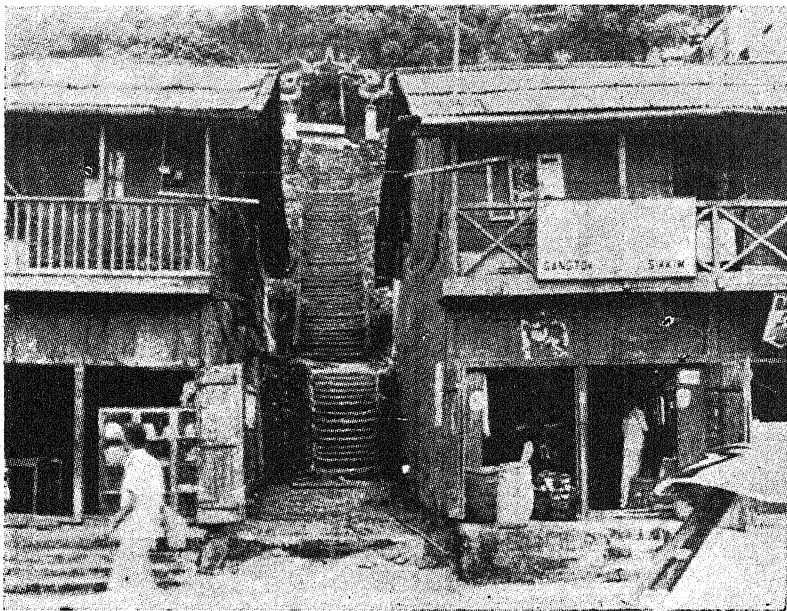


Fig. 10.11. View of Bazaar Area

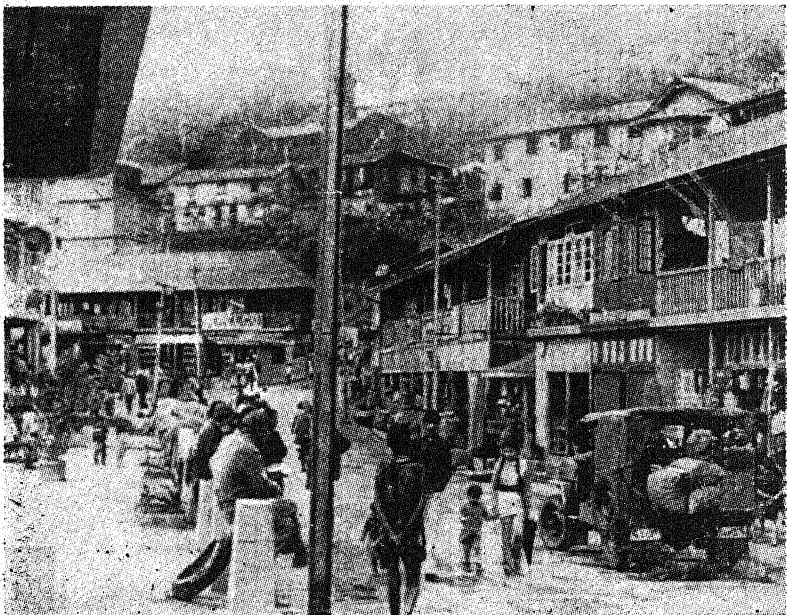


Fig. 10.12. View of Bazaar Area—Enforcement of Proper Architectural Control Necessary for Development.

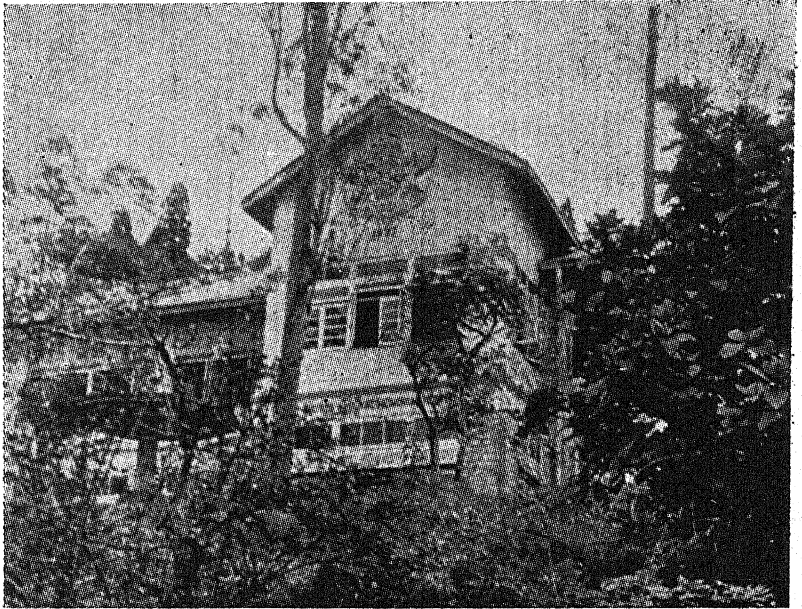


Fig. 10.13. View of Existing Hospital.

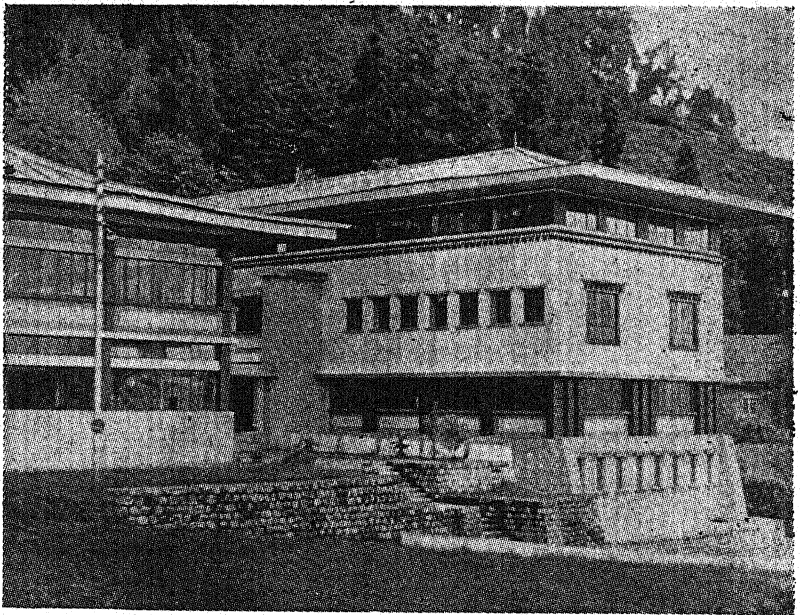


Fig. 10.14. View of New Block—T.N. Academy.

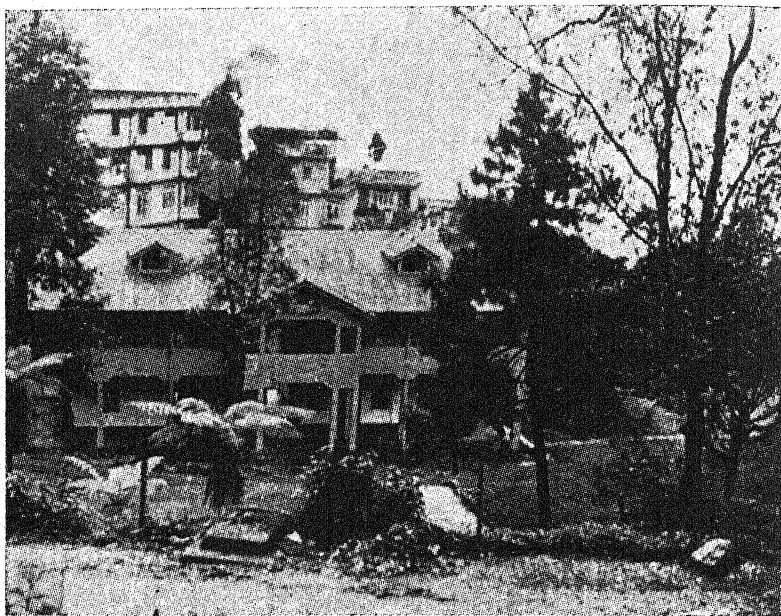


Fig. 10.15. View of T.B. Hospital



Fig. 10.16. Existing S.N.T. Workshop—Inadequate Space for Expansion—Proposed to be Shifted at an Area to be Developed as Community Centre.

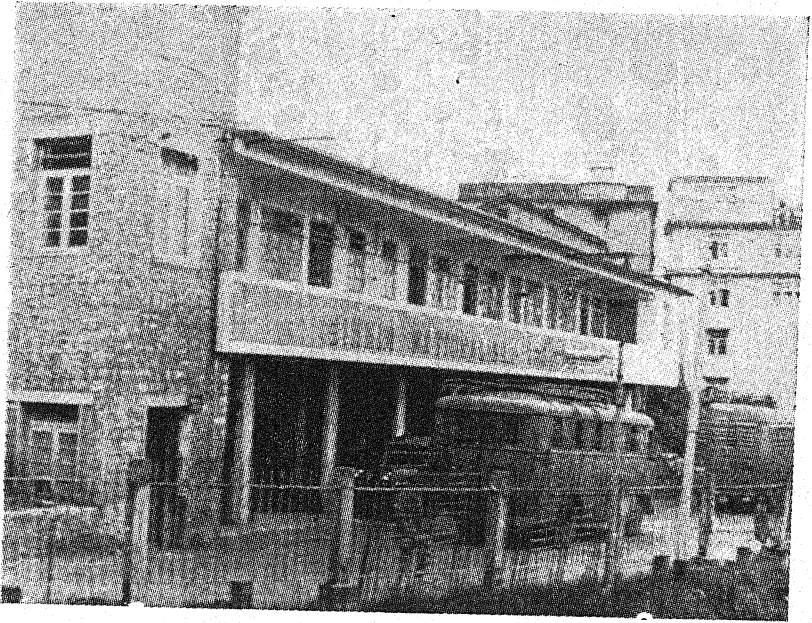
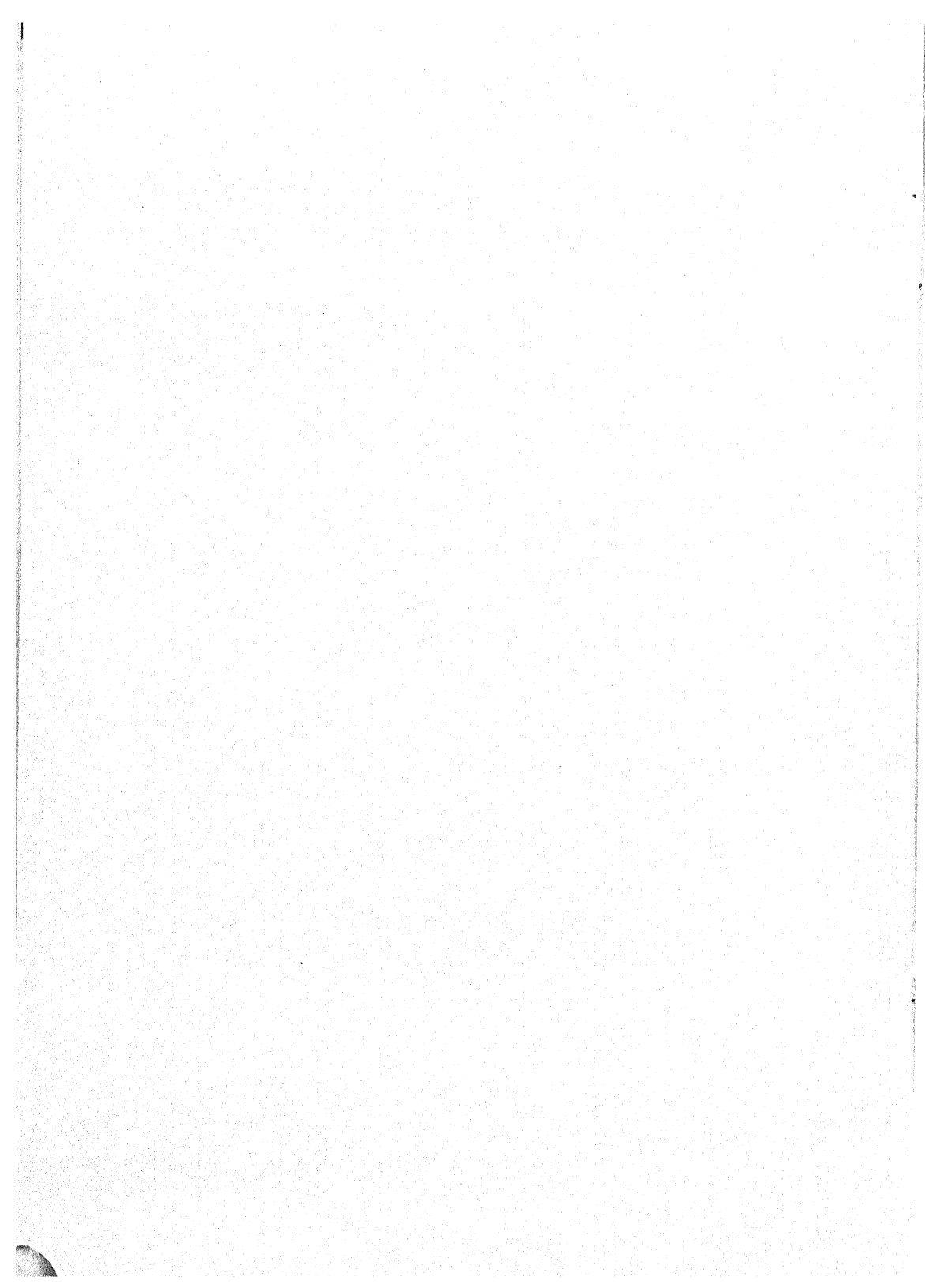


Fig. 10.17. S.N.T. Booking Office—Inadequate Space for Parking, Loading, Unloading—to be Retained as Booking Office only.



There is an existing technical institution and the same has been retained in the Master Plan. It is proposed that the sales section of the technical institution is shifted to the new community centre complex proposed at the site of the S.N.T. Workshop. It is also suggested that the present Sikkim P.W.D. offices are shifted to the new Secretariat complex and the present building of the Sikkim P.W.D. offices is utilised for expansion of the Technical Institution. This would facilitate in providing accommodation for additional classes for new trades that may be proposed to be started at the Technical Institution.

The proposal for establishing a University at Gangtok has also been under consideration and it is learnt that a site at Pengyong has already been selected. The proposed site of the University is outside the Gangtok Planning Area. Since the proposed University is to serve not only the Gangtok town but the entire Sikkim, as such, the proposed site of the University is suitable. It is, however, suggested that while planning the University campus, adequate area should be reserved for housing of the students, faculty members and the service population. Facilities such as shops, schools, etc., should also be provided within the University campus. This would be essential since the University complex would be a few miles away from Gangtok town.

Community Centre

A new community centre has been proposed to be developed as a focal point of the tourist activities at the present site of the S.N.T. Workshop and offices. As has already been discussed in detail in the earlier part of this paper, the town of Gangtok is likely to become an important tourist centre. It is, therefore, suggested that facilities such as a modern shopping centre, emporias, tourist information centre, restaurants, banks, library, skating rink and other allied recreational facilities which are an essential feature for the community as well as tourists are provided at a central place which is easily accessible from the hotels, guest houses in the town. The same should be in the vicinity of the transport facilities. The site of the present S.N.T. Workshop is ideally suitable for locating all such activities. This site could be developed in phases for the proposed facilities as the S.N.T. Workshop is shifted to the new site at Tadong as proposed in the Master Plan. It is suggested that some of the workshop facilities which are essentially required for the maintenance of local vehicles of the Government offices and the Palace, are shifted to the proposed site of the Transport Centre. The new community centre also includes the area of the existing community hall and as has already been suggested earlier, the existing community hall should be remodelled to function as a multipurpose hall.

Transport Centre

Presently the facilities for passengers travelling by bus and private taxis are available in a small S.N.T. Building located in the bazaar area. The S.N.T.

booking office is not only inadequate to handle the passenger traffic but the same is located rather badly from the traffic and planning point of view. The S.N.T. goods vehicles are also parked in the open parking area that has been developed at the approach of the bazaar. It is expected that in future for the increased passenger and goods traffic, the existing facilities would be highly inadequate and, as such, a new transport centre has been suggested to the south-west of existing Police Station and West Point School. This site would be directly approachable from the National Highway. It is suggested that at the transport centre, adequate facilities for parking of goods carriers and passenger buses are made available. Adequate workshop facilities for the immediate minor repairs, passenger booking offices and the goods booking offices alongwith facilities for warehousing should also be provided at this very site. The present S.N.T. booking office could, however, continue to be utilised but the passenger buses should ultimately terminate in the transport centre complex. All idle passenger buses and the goods carriers should be parked in this proposed centre. It is suggested that ultimately when the proposed bye-pass road in the west is constructed, a suitable approach road should be provided to connect the transport centre to the proposed bye-pass road.

Communications

The National Highway passes through the heart of the Gangtok town and the roads to Nathula and to Penlang La which carries substantial vehicular traffic are also connected to the National Highway. There is substantial heavy traffic passing through the Gangtok town which creates undesirable traffic hazards. The military convoys to Nathula which also have to pass through the town, sometimes not only create traffic congestion but are also a source of noise and air pollution. It has, therefore, been suggested to provide a bye-pass road towards the east of Gangtok which would take off from the National Highway near Deorali Bazaar and join the road leading to Nathula near the Chan Mari area. Similarly, a new bye-pass road has been proposed in the west of the Gangtok town which is again connected to the road leading to Penlang La. This would not only facilitate the movement of through traffic which necessarily need not pass through the town but would also, at the same time, serve as a part of the circulation system for the movement of the traffic within the urban area. It is, however, suggested that there should be adequate control over the construction of buildings abutting such important roads. It would be desirable that the proposed bye-pass roads should only provide limited access to the adjoining residential areas.

Slum Clearance and Rehabilitation

Certain existing residential areas, namely, Chan Mari area, area to the

west of old cantonment, area to the east of bazaar (near Qazi Road) would require redevelopment and rehabilitation. It has also been observed that certain sweepers' houses, in extremely unhygienic conditions, are existing to the south-west of West Point School. This site would be required for the development of the new transport centre.

It is suggested that while planning the new residential areas, adequate provision is made for the rehabilitation of the families that would be affected by the slum clearance and rehousing scheme. This would ensure that the families proposed to be rehabilitated are not shifted to far of places. A site for re-housing the sweepers colony has been suggested along the bye-pass road and towards the east of the proposed sewage treatment plant. The existing slaughter house which is also located to the south-west of the West Point School is also proposed to be shifted to a new site near the proposed sewage treatment plant on the bye-pass road in the west. A few families of Tibetan Refugees are residing in sub-standard houses in the Qazi Road area. It would be desirable that this area is also redeveloped and the families rehabilitated either at the same site or in some new residential area. It is observed that there are a number of residential houses of poor quality and sub-standard nature located along the existing road that provides access to the present jail site (from the Chan Mari area side). This area has good potential for development as a good residential area. In case the new cottages for the tourists and hotel facilities are provided at the present site of the jail as suggested earlier, it would become even more necessary to redevelop this slum area on priority basis.

DEVELOPMENT OF SERVICES PLAN FOR GANGTOK CITY

In this report attempt is made to study possible methods by which a demand for providing sewerage system for Gangtok city can be satisfied. Brief reference is made to the existing and proposed augmentation of water supply arrangements already undertaken by Sikkim P.W.D., so as to arrive at data for sewage system.

Feasibility of adopting particular sewerage system/treatment plant with due consideration to the statement of cost and advantages/merits of particular type of treatment, suited to the topography of Gangtok town has been attempted.

Specific recommendations have been made on the basis of observations and site inspection. It may be made clear here that detailed study regarding investigations/surveying and soil explorations shall have to be carried out with necessary engineering techniques, before working drawings and technical estimates are prepared for actual execution of the work.

Existing Water Supply System

The existing springs are, at present, the source of water supply for Gangtok

town. Average level of the town lies between RL 5000 to 5500 ft. whereas springs are located at an altitude of 6800 ft. above mean sea level. Water is collected through gravity main into main storage reservoir of 10 lac gallons capacity located at Selap at RL 6340 ft.

Two additional tanks one of 80,000 gallons and other of 30,000 gallons are available for storage to meet all types of demand. This source is sufficient for meeting the water requirements of existing per capita supply of 30 gallons per day. Total requirements are 4.8 lacs gallons per day. The distribution of this water is made through network of 16 service reservoirs located at different levels. The service reservoirs are so situated so that the areas commanded by each service reservoir is within the pressure head of 100 to 150 ft.

With the ultimate population of about 45,000 persons and proposed per capita supply of 50 gallons per day the total requirement shall be 2.25 M.G.D. Requirements for kitchen garden and fire fighting purpose are also included in the designed per capita supply of 50 g.p.c.d., whereas the industrial and other requirements are additional for which provisions have to be made.

For meeting this master plan requirement of water, Sikkim P.W.D. has already taken advance action on new river source located at Rathey Chu and action for laying conveying main up to the treatment work has been taken in hand. It is also informed that the filtration treatment of this water for designed capacity of 1.8 M.G.D. has already been awarded to Messrs. Pattersons Engineering Company. Thus existing and new sources are capable of meeting the master plan needs of water supply.

It is also presumed that details regarding well designed intake works shall be considered for new source of supply.

Sewerage Master Plan

Dry method of sewage is in practice in the town and consists of collection of night soil in privies and cesspools in community latrine blocks. It is removed by manual method and transported to points of ultimate disposal.

It is proposed to adopt water carriage system in which well designed sewers with treatment works are suggested. Adoption of separate system has been recommended as average rainfall of the place varies from 136" to 154" per annum. The existing dependence for the disposal of rain water has therefore been kept undisturbed and no attempt is made to include rain water into sewers.

The sewerage plan has to be designed for master plan population of 45,000 souls. The rate of discharge for sewage contribution has been assumed 80 per cent of total water supply, i.e., $50 \times \frac{4}{5}$ 40 g.p.c.d. Sewers are designed for peak flow condition which has been anticipated three times dry weather flow.

The sewerage system of the Gangtok town has to be divided into six zones mentioned below. Designed population for sewers as well as treatment

works for each zone are indicated. The population figures are likely to be achieved as per land use plan adopted in this report.

<i>S. No. of Zone</i>	<i>Name of Place</i>	<i>Design Population for Sewerage</i>
1.A.	Bazaar and business centre including Palace area	200,000
2.B.	Development area including Bulwa Khani	15,000
3.C.	Bhurtuk area	200,000
4.D.	Sikkim Guard area	5,000
5.E.	East of Jail and Enchey Tank	5,000
6.F.	Industrial area adjoining Tadong	4,000 gallons per acre of Ind. area.

The question of adopting single treatment plant at isolated place for entire Gangtok town vis-a-vis separate treatment units for different zones has been considered and examined in detail. Hilly region topography calls for separate treatment units for each district as either the cost of interconnecting outfall is abnormally high or level difference is so much that technically gravity flow is not possible. Cost of pumping station and rising main is also exorbitant and therefore single isolated plant for this town is not recommended. Geological formation of the soil also are not favourable for construction of deep sewers as certain areas are predominantly 'slip areas'. The soil consists of neither clay nor sand but is of conglomerate nature which prevents laying deep sewers for longer lengths.

Keeping the above consideration in view, initially primary disposal works are proposed to be adopted for zones (B) and (C) whereas full treatment consisting of primary and secondary nature should be adopted for existing thickly populated zone (A). However in second stage when proposed Ring Road is constructed and districts (B) and (C) are fully developed; trunk sewer may be laid connecting the primary treatment works of zone Nos. (B) and (C) with zone (A), when suitable additional units of secondary treatment can be provided at the site of disposal works of (A) zone. The levels and location of disposal works of zone (B) and (C) should be fixed in such a way that the above proposal shall be possible under gravity and cost shall not be abnormal as Ring Road by that time shall be constructed as per master plan. For Zone Nos. (D) and (E) of the residential area and zone (F) of Industrial area separate treatment by Septic tanks is considered adequate, as population is limited to 5,000 persons. For this small population no further treatment is required as discharge from this can be allowed to existing Rangni Chu and Rora Chu rivers which are not the source of supply for any town down stream. Minimum discharge of 20 to 30 cusecs is available in Rangni Chu and Rora Chu, therefore, dilution of effluent from all the districts is possible.

Storm Water Disposal

The average rain fall of the place varies from 136'' to 154''. Because of hilly topography, adequate grade is available and therefore rain water finds its natural course to the nearest jhora which ultimately discharges into Rangni Chu or Rora Chu river. Since geological formations are not rocky in nature it is necessary to construct regular storm water channels up to the nearest 'jhora' and these 'jhoras' are well channelised so that erosion of soil is avoided.

II

Public Works Administration in Urban Areas

When primitive man built a crude hut of mud and tree branches as a shelter from the weather, he became the first builder and thus began the glorious heritage of the fine building work that has been handed down the ages and remains mankind's joy and responsibility today.

THE GLORIOUS HERITAGE OF BUILDING WORK

Little is known about the very first buildings, but there still remain structures thousands of years old, which survive! Among the first people to develop the art of building construction were the Egyptians and Babylonians, and the buildings that remain are either temples or tombs, which at that time had the greatest importance, and were so well built that some of them have survived more than 5000 years. The erection of immense Egyptian structures was made possible by the vast amount of labour available; this was used for transporting the building materials for great distances, but the exact technical and administrative methods used in building great monuments like the pyramids are still unknown.

Similarly, the earliest roads were mere tracks or trails made by the continued passage of feet, and these naturally took the line of least resistance between points, skirting ponds, clumps of trees, rising grounds, and other obstacles. The Romans took some of the less crazy of these in hand and converted them into stone-paved highways such as befitted the Roman reputation for superb road engineering.

The story of public works and its administration can thus be traced to the days of primitive man. Referring to the first cities in the world, Andreas Lommel says: "Just as agriculture and domestication of animals had been discovered in Western Asia, so also was the step from village to town life taken there, the step from a primitive to an advanced organisation of society. The latest excavations at Catal Huyuk in Southern Anatolia and at Jericho have brought to light walled and fortified urban settlements which came into being about 6000 B.C."¹

The earliest Indian monuments known are a series of brick ruins unearthed

¹Andreas Lommel, *Prehistoric and Primitive Man*, Paul Hamlyn, London, 1966.

in the Indus Valley, the most exclusive site being at Mohenjodaro and Harappa. These archaeological finds at Mohenjodaro and Harappa reveal that building traditions in India prevailed during an epoch 3000-1500 B.C.² This 'mound of the dead' reveals houses constructed with burnt bricks complete with drainage system. The houses are well laid out with verandahs, swimming pools and hot air baths. The paved streets show signs of drains on either side indicating knowledge of sullage disposal and drainage. All this is indicative of execution of public works as an organised function of the State.

Kautilya in Arthashastra, one of the important works on Government functioning and politics, speaks of officers of the State incharge of finance, public works and royal correspondence. According to this shastra, duties of a king included construction of reservoirs full with water—either perennial or drawn from other sources—and providing roads and other such necessary requirements. The book contains details of layouts of villages, townships, forts, width of roads, chariot roads, royal roads and roads leading to military installations.

This glorious heritage of building work 'like a dome of many coloured glass' has left its stains through the Maurian Art, the monoliths popularly known as Ashoka Pillars, the grandeur of Nalanda, the works of slave king Kutub-ud-din and the world famous saracenic architecture.

THE PUBLIC WORKS ADMINISTRATION DURING BRITISH PERIOD IN INDIA

During the British period, for obvious reasons the stress was on different type of constructions. While construction of railways was entrusted to different companies, the publicworks like roads, buildings and irrigation were entrusted to the Military Boards in all the three Presidencies of Calcutta, Madras and Bombay. The arrangements continued from the year 1773 to 1858. It was in the year 1849, when new Province of Punjab was annexed by the British that a Department of Public Works was created for construction of a large number of bridges on Grand Trunk Road to Peshawar and various irrigation works on Upper Doab Canal in the year 1851. The roads from Kalka to Simla and Chini to Sutlej and the works of Upper Ganges Canal were also completed by the year 1854. With success of Public Works Department in Punjab, as distinct from Military Boards, similar departments were set up in Bengal, Madras and Bombay and were placed under the charge of a Chief Engineer under the Lt. Governor of each province. The work load of the public works throughout the country during the year 1850 was Rs. 60 lacs which rose to Rs. 226 lakhs by the end of year 1854. During the years 1863-66, the Department of Public Works in Government of India, was split in three separate branches to deal with Military works, Civil and Irrigation, and Railway works. With

²Joseph Campbell, *The Art of Indian Asia*, Princeton University Press, 1968.

formation of Local Boards in the year 1872, such as District and Municipal Boards, number of works were transferred to such local bodies.

At the Imperial Durbar held at Delhi on December 12, 1911, King George the Vth announced the decision to shift the capital from Calcutta to Delhi, and before leaving the city he laid the foundation stone for the new capital at a hurriedly chosen site, not far from the Coronation Pillar. This site was later changed to the present site by a committee which was set up under the chairmanship of Captain Swinton. The Royal Institution of British Architects was requested to recommend suitable architects for designing the city and they recommended the name of Sir Edwin Lutyens who took Herbert Baker as his co-partner in the task. The execution of work was entrusted to Imperial Delhi Committee which had Chief Commissioner of Delhi as President and Chief Engineer as Engineer-Member. The works of the Capital Project were in the charge of the Chief Engineer who was assisted by Superintending Engineers in the field of Civil & Electrical Engineering and an Executive Engineer. The post of Executive Engineer was held by the first Indian Engineer Shri Teja Singh Malik who later became Sardar Bahadur Sir Teja Singh Malik, the first Indian Chief Engineer of the Central Public Works Department. With the gradual completion of the Capital Project Works the Public Works Organisation was transferred to the administrative control of the department of Industries and Labour in the Government of India. And thus came into existence the present Central Public Works Department in the month of April, 1930.

THE ADMINISTRATIVE SET-UP OF A PUBLIC WORKS ORGANISATION

An organisation is often thought of as a formal arrangement of individuals and units in a pattern as depicted on an organisational chart. This clearly earmarks responsibilities, indicates levels of supervision and authority and establishes channels of communication. However, there are informal organisational relationships which exist among individuals or units in an organisation as the result of operational needs and are also matters of personal equation. These relationships shape the day-to-day functioning and often improve on the formal organisational structure. They may also reveal ineffective executives or employees, confused targets or methods, personality clashes and jealousies.

A Public Works Organisation is divided into administrative units called 'circles'. Each circle remains under the administrative control of a Superintending Engineer. Each circle in turn consists of field establishments known as Divisions, which are placed under the charge of Executive Engineers, Civil, Electrical or Mechanical depending on the nature of work. The Divisions are in direct executive charge of the works. A Division is made up of four or more Sub-divisions manned by Asstt. Engineers. Each Sub-division comprises of four or five sections, which are placed under the charge of engineering supervisors known as Section Officers.

Besides these engineering personnel, the Chief Engineer who is the head of

the department is assisted by an Architectural Wing, Horticultural Wing and number of other officers connected with financial and establishment matters.

The Superintending Engineers and Executive Engineers are responsible for implementation of the policies and programmes as laid down by the Chief Engineer. The Executive Engineers have to account for the expenditure on various projects to the satisfaction of audit. This satisfaction, however, is very rare.

It may be difficult to define good organisation but it should be easy to identify one when one sees it. Some of the important measures to judge an administrative structure would be :

- (i) Definite and clear-cut responsibilities assigned to each executive.
- (ii) Responsibility should always be coupled with corresponding authority.
- (iii) No executive or employee, occupying a single position in the organisation should be subject to orders from more than one source.
- (iv) No executive or employee should be required or expected to be at the same time an assistant to and critic of another.
- (v) There should be well defined delegation of powers to the lowest possible level, and there should be a workable span of control and a rational grouping of related activities.

By all these tests the present-day administrative set-up of a public works department would be adjudged as a satisfactory arrangement. There are, however, many other factors which in spite of good organisational set-up weaken the system and undermine its effectiveness and efficiency.

We shall now briefly discuss some of these.

THE ART OF INVITING TENDERS AND THEIR SCRUTINY

By and large the public works departments survive by calling either percentage rate tenders or item rate tenders and after some scrutiny at half a dozen levels accepts the lowest offer. This in my opinion has been one major factor which is responsible for cut-throat competition, survival of unscrupulous contractors and resulting damage that is caused to the industry of building construction.

Little imagination is shown in the matter of calling tenders and almost invariably stereotype notices inviting tenders are issued which leave no scope for good engineering firms to display new advancements made in the field of technology.

The technological advancement is not only limited to the machinery and method of construction. The design concepts keep changing yielding place to revolutionary ideas. The tender queries, therefore, have to be such as to provide scope for competition in these directions also. Such a method of tendering

would also help eliminate the mediocre firms and only the best in the trade would be left to compete. The Patel Road and Defence Colony flyovers recently constructed in Delhi are a direct result of this type of tendering.

Figure 11.1 shows the traffic congestion as it existed before construction of the flyover and Figure 11.2 shows "traffic relief" provided by construction of this facility. In a developing country, one should not be always on a lookout for costly projects. Many situations can be served by cheap indigenous methods. Figure 11.3 shows a boat bridge that is assembled every year over the river Jamuna after the monsoons are over and water level goes down. The work is done departmentally by the engineering department of Delhi Municipal Corporation. This facility is utilised by thousands of cyclists and pedestrians for about eight months in a year. The boat bridge is strong enough to permit even light vehicular traffic.

"Stores-Purchase" is yet another problem which has no cut and dry solution. Whether various stores should be purchased centrally or not whether annual indenting for every material is necessarily a correct policy and whether the indenting officer and purchasing officer should be same or not are some of the issues which can provide different answers under varying circumstances. Personal experience and insight in such matters plays a very important role and in my view it is a matter connected with the personal style and arbitrary decision of the Chief Executive of the organisation. A typical example is that of methods deployed for procurement of sophisticated road building machinery by different organisations in the State of Delhi. The successful method was certainly not the well laid-down procedures and norms for procurement of important plants and machines indicated in the Public Works Accounts Code.

The authority under which the purchase department is to be placed is perhaps the most important factor. Haughton in his book "Works Management and Organisation" has answered this important question in the following words :

The question of the purchase department's position in the organisation must always be given due consideration as its efficiency will have a marked influence upon the other sections. When the various departments are placed upon a functional basis, the purchase department, so far as the buying of equipment, sundry goods and material to be worked up into manufactured articles, is concerned, comes under the authority of the works manager, since the latter, being in control of the works, must have control over the purchases made on its behalf.³

Corruption in Public Works Departments is yet another factor which requires firm but a different type of handling. The defects in handling of such

³P.S. Haughton in *Works Management and Organisation*, E. & F.N. Spon Ltd., London.

cases by Special Police Establishment and Chief Technical Examiner's Cell are obvious. While the S.P.E. on one hand has been blamed for being a non-technical organisation that does not understand the technical intricacies; the C.T.E. on the other hand is criticised as an organisation comprising of officers who are drawn from the same 'source' and who are not senior enough to be able to give their opinions in a fearless manner. The most effective vigilance however can be exercised by departmental chiefs themselves but far more lasting results can be achieved by building up the character of the citizens. It is most disheartening to see that the social worker today instead of working in this direction finds it more lively and attractive to indulge in slogan-shouting.

THE DOWNFALL OF "EDIFICE COMPLEX"

A public works programme in the present times must be grounded in the requirements of the community. Buildings and roads are constructed today with the object of fulfilling the most pressing needs rather than for preserving a dead Pharaoh, or immortalising a dead queen, much less for the sake of royal splendour as in Versailles. The greatest challenge which stimulates a person engaged in a public works programme today is not a tomb or a mausoleum, a monarch's palace or a pyramid, but the dwelling of the humble and the needs of the multitude. An engineer in India cannot afford to suffer for what "The Peter Principle"—one of the most waggish books I have read—describes as "Structurophilia". I can do no better than quote from the book. "In its extreme pathological manifestations (Gargantuan monumentalist) it reaches a stage where the victim has a compulsion to build great tombs or memorial statues. Ancient Egyptians and modern Southern Californians appear to have suffered greatly from this malady."⁴ Nor can a public works department in India be accused of suffering from what may be called the "Edifice Complex" which tends to afflict philanthropists wishing to improve education, health services or religious institutions. "They consult experts in these fields and discover so many at their levels of incompetence that formulation of a positive programme is impossible. The only thing they agree on is to have a new building. Frequently, the advising educator, doctor or minister suffers from Structurophilia, and therefore his recommendation to the doctor is 'Give me a new building'. Church Committees, School trustees and Foundation Boards find themselves in the same complex situation. They see so much incompetence in the professions that they decide to invest in buildings rather than people and programmes."⁵ Any department in India which concerns itself with buildings and roads cannot be accused of suffering

⁴Dr. Lawrence G. Peter and Raymond Hull in *The Peter Principle*, Pan Books Limited, London, 1970.

⁵*Ibid.*

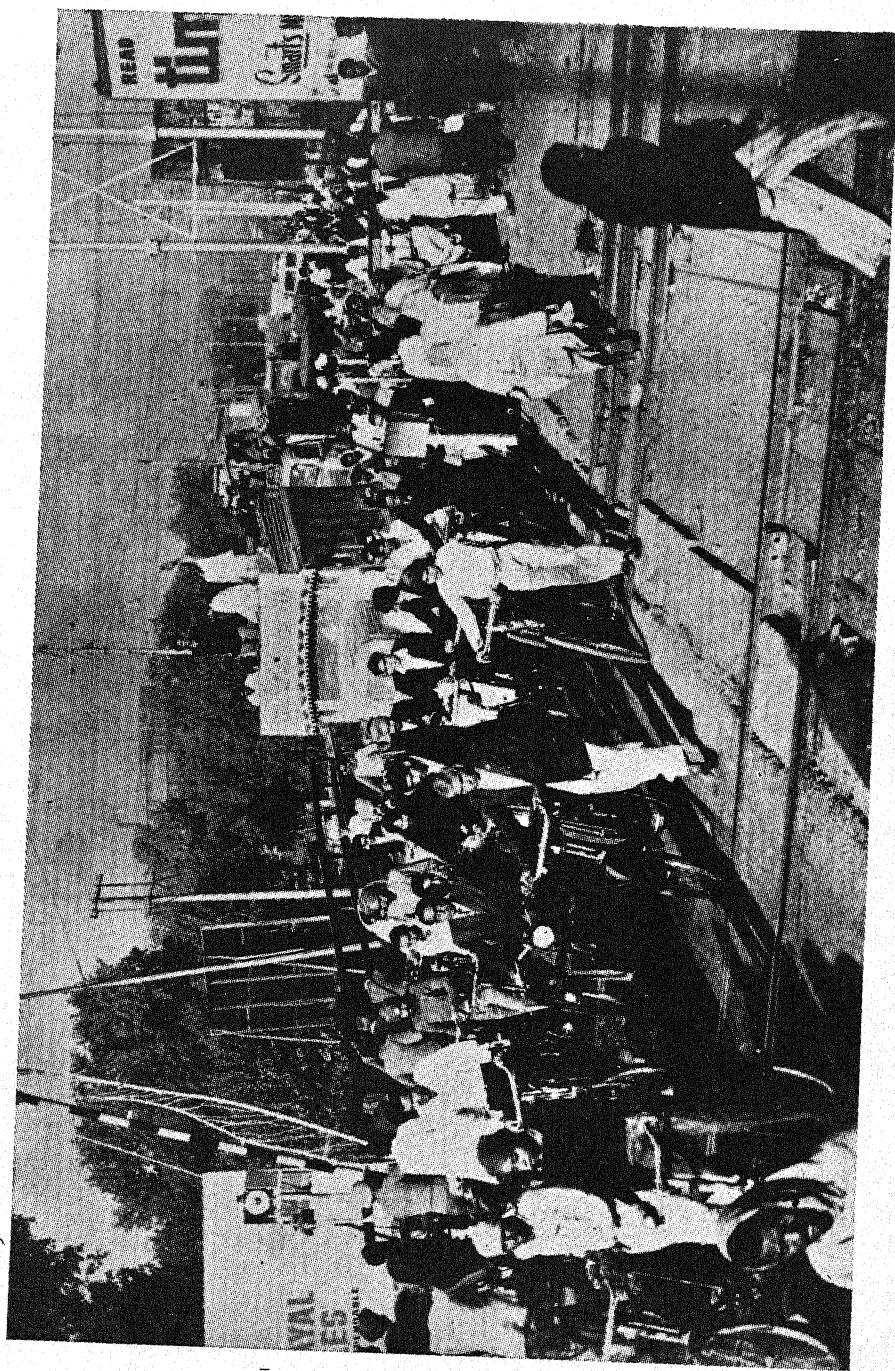


Fig. 11.1. Traffic Congestion before Construction of a Fly-Over.

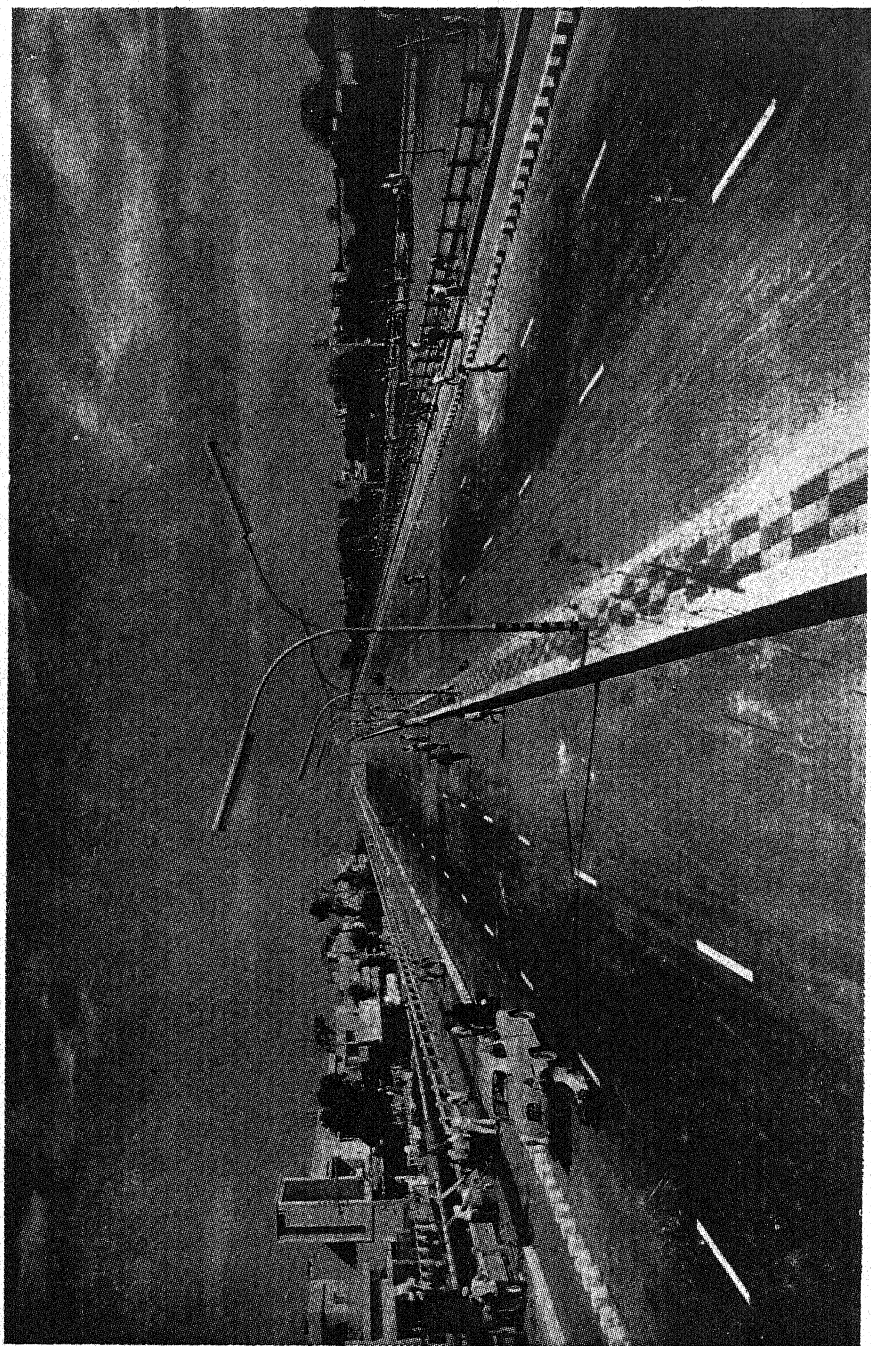


Fig. 11.2. Traffic Relief Provided by Construction of the Fly-Over.

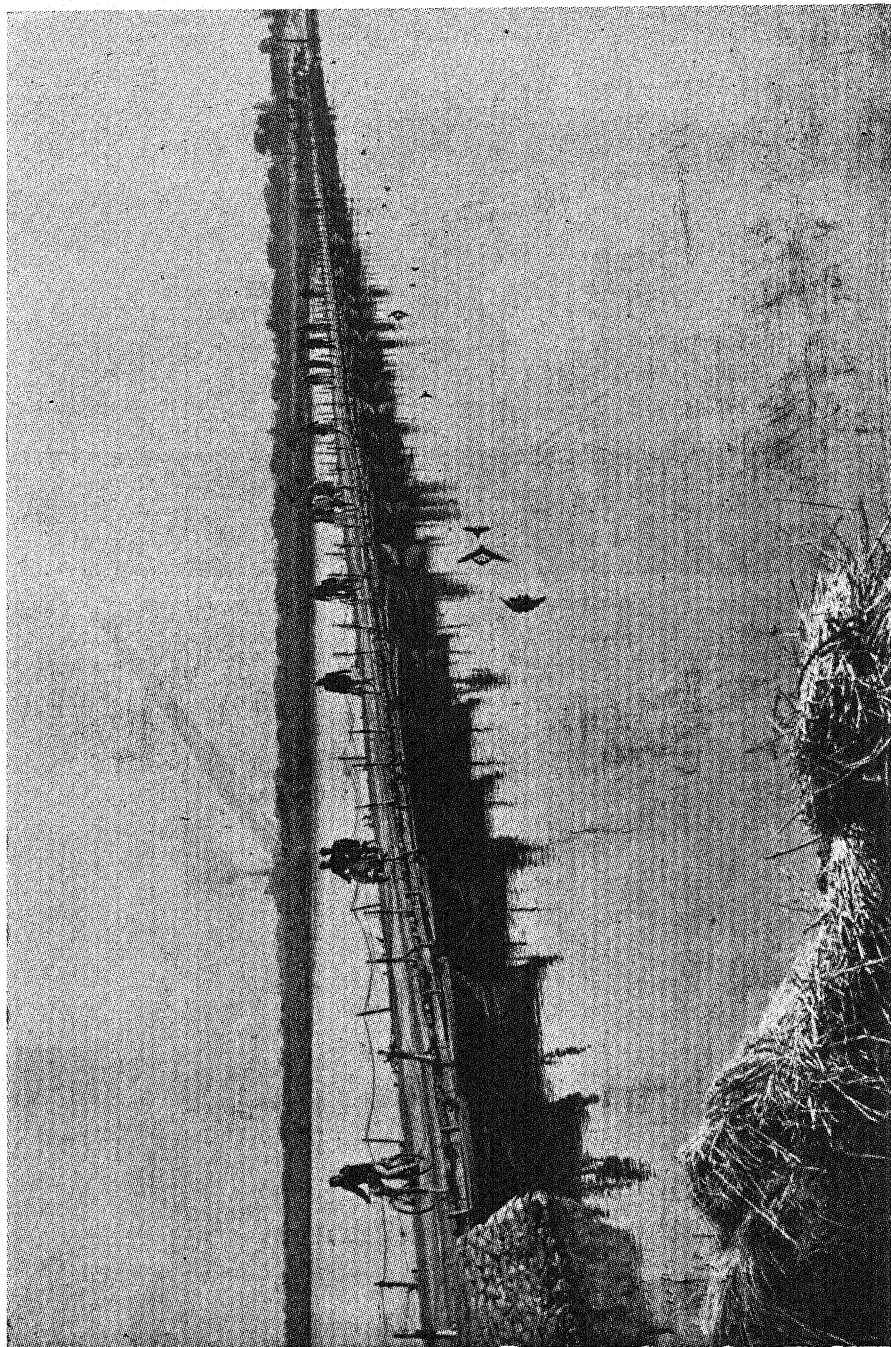
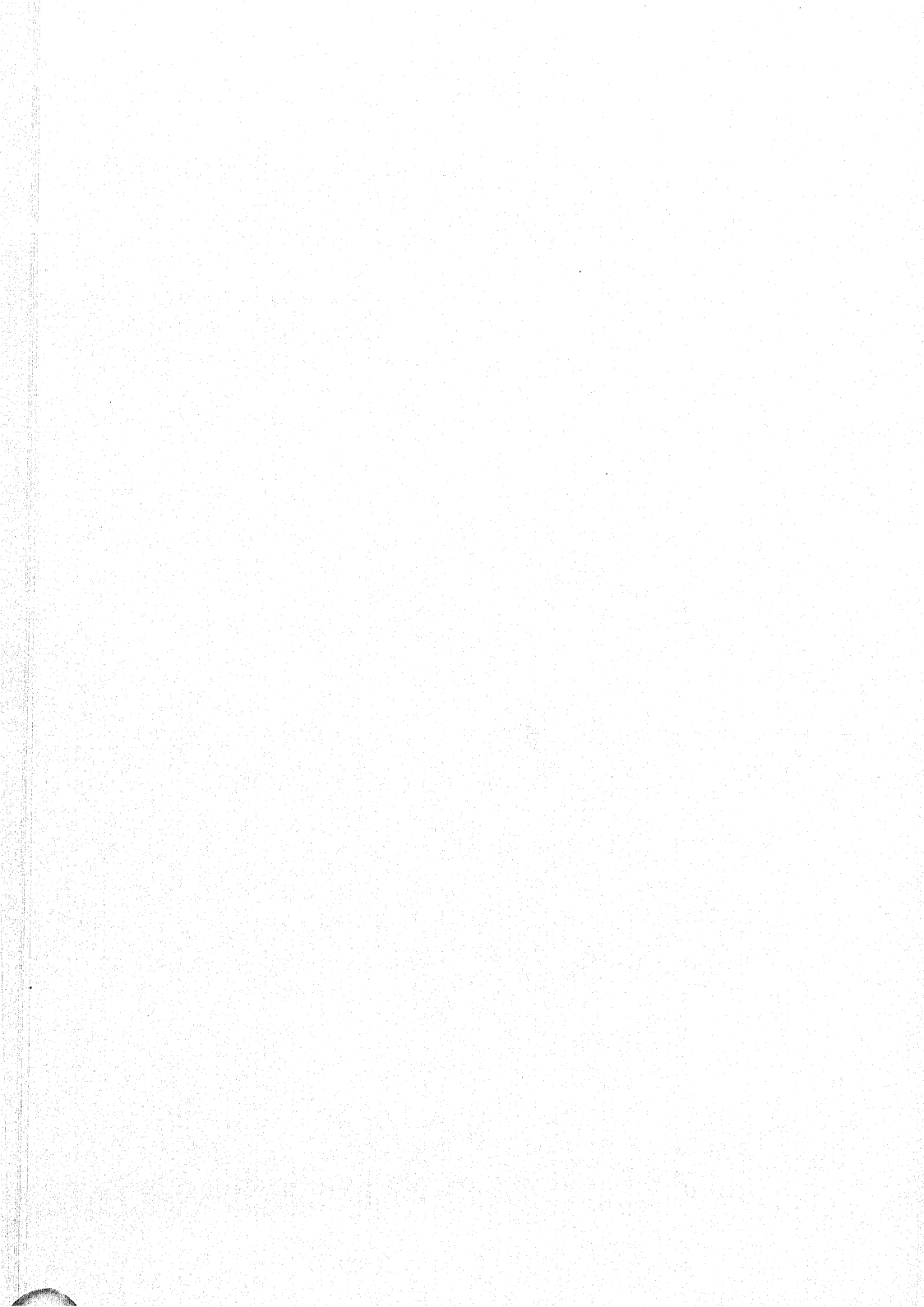


Fig. 11.3. The Boat Bridge—Cheap, Indigenous and Useful.



from this complex. In a country which needs houses, the epitaph which a great builder most likes written about himself would be: Here lies one who gave the greatest attention to utility, economy, facility and modernity and yet in building something which had these qualities, created a certain comeliness and proportion which was dictated by the constraints of these very virtues. Thus the hiatus between utility and beauty must become narrower and narrower until it is no more. Even in paleolithic times the quality of the curves of a flint was as much a matter of concern to the maker as the sharpness of its edges. One led to the other; and as the edges sharpened, the curves grew gentler. And this harmony the modern builder in India has to achieve not so much in tall buildings as in little structures. The most impressive thing about a structure may not always be its size. As Ben Johnson rightly said:

It is not growing like a tree
 Dry bald and sere
 That doth make man better be
 A lily of a day
 Is fairer far in May
 In small proportions we great beauties see
 In small measures life may perfect be.

An engineer today cannot live in a world of his own. The walls of specialisation are breaking down. When the Greek architect of Islamabad can conceive of our entire planet as one uninterrupted conurbation, no one at all can isolate himself in that manner. Painters are designing machine-made articles as well as ballet settings and have entered into fields of weaving, ceramics and glass. The people when they take delight in a streamlined aircraft, in a mechanised kitchen or in a simple, gaily coloured gadget or an automobile on the basis of its line and colour are perhaps laying the foundation of a new style that will be expressive of the new emerging order. There must need be a greater interpenetration among the worlds of building, town planning and architecture. The builder must take into account the paramount need for establishing a communion with the surroundings. He must also consider the difficulties of the commuter, the requirement of open spaces, of shopping convenience, of children's playgrounds. Like Francis Bacon he must be "a citizen of the world".

Public Participation in City Governments*

For City Governments the important thing to my mind is somehow to make the citizens proud of their city, to love its avenues and sidewalks, its rendezvous, its places of recreation, its personality itself—the way Dr. Johnson or Boswell or Goldsmith loved London. “He who is tired of London”, said Johnson, “is tired of life.” The city, to those endowed with a certain sensibility is not just houses or dwellings or buildings but an atmosphere, a way of life and a style in the finest sense of the term. It is not just an aggregate of its different limbs and parts but something more than the aggregate—one might call it the soul. It is impossible for one to have this sort of relationship with a city when the great decisions concerning the city leave one untouched, if ‘they’—those eerie strangers in a Town Hall building—take their decisions in the solitude of their chambers. The attitude to the digging of trenches for sewers may be one of hostility in the case of a person to whom his favourite resorts become tracks of obstacle races. It may be one of the most indescribable thrills in the case of another who has been associated with the planning of a sewerage system. The important thing is the sense of participation in a plan for the city as it unfolds itself in different schemes. The point has been made with varying degrees of emphasis in the past, and the point is well taken.

But the question persists: how do we impart to the citizens a sense of pride and a sense of belonging? Some of it may come in the consciousness of heritage if it were a city with a history. But the main question concerns that continuing sense of adventure as a beautiful city becomes more beautiful and the less beautiful more comely. And let us remember the fact that it is not as if all the finest decisions can be taken by what is known as the Establishment as if all we have to do is to give the citizens a lively sense of participation. I hope we are not talking in terms of an illusion of participation. The more important point is that this participation makes a qualitative difference to the decision itself. The decision is the better for being enlivened by the attitude and approach of those who are the potential beneficiaries or victims of that decision. One cannot help being amused by the smugness of those in authority

* Presented at a Seminar on Civic Consciousness held at Vigyan Bhawan during 2-3 January, 1973 under the aegis of Delhi Municipal Corporation and Indian Institute of Public Administration, New Delhi.

Figure 12.1 also shows that the Citizens Council may have direct dialogue with Professional staff because it is felt that for day-to-day needs, certain policy programmes are decided at that level and as such those programmes could be sorted by Citizens Council direct with the Professional staff. For the programmes, which can be decided only at the level of Legislators it is essential that the Citizens Council and outside experts should have discussions not only with the policy board but also with the Legislators staff direct. The policy programme thus framed can be considered as a programme which has been evolved with public participation and when implemented will be of great interest to the citizens to watch its execution.

In the developed countries, where the civic consciousness comes automatically to its citizens because the same has been inculcated into them through generations of proper education in schools and through television, cinema, newspaper, etc., public involvement is practised in a different manner. Local Governments examine their potential future with the help of public participation of younger generation and thus they try to evolve ... solutions full of imagination to their problems of the future as well as present. Alvin Toffler explains how one way to do so "would be to establish in each community 'imaginetic centres' devoted to technically assisted brainstorming. These would be places where people noted for creative imagination, rather than technical expertise, are brought together to examine present crises, to anticipate future crises, and to speculate freely, even playfully, about possible futures".

What, for example, are the possible futures of urban transportation? Traffic is a problem involving space. How might the city of tomorrow cope with the movement of men and objects through space? To speculate about this question, an imaginetic centre might enlist artists, sculptors, dancers, furniture designers, parking-lot attendants, and a variety of other people who, in one way or another, manipulate space imaginatively. Such people, assembled under the right circumstances, would inevitably come up with ideas of which the technocratic city planners, the highway engineers and transit authorities have never dreamed.

Musicians, people who live near airports, jack-hammer men and subway conductors might well imagine new ways to organise, mask or suppress noise. Groups of young people might be invited to ransack their minds for previously unexamined approaches to urban sanitation, crowding, ethnic conflict, care of the aged, or a thousand other present and future problems.

In any such effort, the overwhelming majority of ideas put forward will, of course, be absurd, funny or technically impossible. Yet the essence of creativity is a willingness to play the fool, to toy with the absurd, only later submitting the stream of ideas to harsh critical judgement. The application of the imagination to the future thus requires an environment in which it is safe to err, in which novel juxtapositions of ideas can be freely expressed before being critically shifted. We need sanctuaries for social imagination.

My visit to the City Hall of Toronto taught me more about the art of city

government than all the great speakers I heard and the books I read. I was reminded of the following lines of verse:

One impulse from the Vernam wood can teach us more of man
Of all the evil and the good than all the sages can.

The City Hall deliberations are watched by citizens from the galleries as in any other city but with a difference. The galleries are so made that the citizens think they are participating in the entire government of the city. How I wish they could make the citizens, by some uncanny miracle, actually take part in city government. Can we do so by some method?

That is the question. In an answer to this question lies the clue to our problem.

Environmental Pollution and Urban Administration

It is a common statement among polluters: "The air has never been pure." That may be so. Thousands of years before the Industrial Revolution, dust storms were producing the haze and volcanoes were belching lava that blackened the skies. The nature in those days had time to make adjustments. It could evolve an atmosphere that was self-cleansing. Today man in his unquenching thirst for comforts, is so arrogantly misusing his environment that he is quite close to suffocating himself. The most widely talked about aspects of pollution are those created by urbanisation, industrialisation and motorisation. In the developing countries poverty, inadequate food, ignorance and disease produce graver consequences. Between 75 and 90 per cent of the people in developing countries continue to use unsafe drinking water and the cities are often used as waste baskets in which the amount of refuse grows all the time. Refuse of all kinds including human excreta, dead animals and wastes from slaughter houses attracts birds, flies, mosquitos, rodents, pigs and pickers, passing on hazardous germs of illness to man.

The United Nations Conference on Human Environment held at Stockholm during 5-16 June, 1972 was held to identify the most urgent environmental problems and obtain agreement on action to deal with them. The Conference raised the standards to realms of ecological balances, population planning and the relative impacts on the developed and developing countries. The word ecology has been derived from "OIKOS" meaning "house" in Greek.¹ It is a science of the "mutual relationship" between "living organisms" on one side and their "environment" on the other. When we talk of human ecology we bring in man as the central figure in the environment which surrounds him.

POLLUTION OF ENVIRONMENT

When the physical, chemical and biological projects of the different components of environment, *viz.*, the air, water, soil, noise, aesthetics, etc., change to the detriment of living species, it may be said that environment has been polluted. "Pollution thus occurs when environmental changes create or are

¹Col. Kewal Krishna in "Environmental Pollution and Public Health—Legal and Administrative Aspects" (Mimeographed).

likely to create nuisance or hazards to public health, safety or welfare or when they are harmful to domestic, industrial, agricultural, recreational or other legitimate uses of environmental components or to live-stock, wild animals, fish, aquatic life and other biological species. All aspects of pollution or environment are directly or indirectly related to human health and well-being. The necessity of a healthy environment is well recognised as a paramount component of modern living. The excessive growth and rush of people from villages to urban areas, resulting in overcrowding of cities, rapid industrialisation and urbanisation have led to an increase in environmental pollutant load that poses a serious public health problem. More affluent a society, greater is the amount of effluents—both liquids and solids. Each day an average American tosses out more than 2.5 kilograms of solid waste. Garbage is piling up so fast that cities like Philadelphia and San Francisco may run out of land fill dumps very soon.”² The need for conservation of nature and protection of our flora and fauna is no doubt well recognised but what is disturbing is the lack of adequate concern about the human health and deteriorating environment. Perhaps this is so because the human population in the world is ever on the increase and there have been no spectacular deaths on any large scale. Ritchie Calder, former Professor of International Relations, University of Edinburgh, recalls a Conservation Conference called (and quite rightly) to save the wild life of Africa. The participants had enthusiastically discussed the measures to protect the lions, the elephants, the hippopotamus, the wildebeest, the rhinos, etc., and their habitat until Sir Julian Huxley, that dedicated conservationist, was constrained to remind them, “Gentlemen, Gentlemen: Remember that human beings are also part of ecology”. The human species, with all its faults, heeded conserving too.³

The disastrous smogs of Meuse Valley in Belgium (1930), Los Angeles (1946), Donora in Pennsylvania (1948), Poza Rica in Mexico (1950) and the best known example of London (1952) are some of the disasters in which infants and elderly people were taken ill and many died. In the London smog alone, lasting five days, there was in the Greater London area a total of about 4,000 excess deaths within a period of 2 weeks of the episode.⁴ The incidents did arouse public interest and stimulated the health authorities to take corrective measures which we shall discuss in coming paragraphs. What, however, goes almost unattended is the high toll of human life and health caused by environmental factors in the economically weaker societies in developing countries. “Here, populations are ravaged by infectious diseases set in motion by unprotected water supplies and inadequate waste disposal, food sanitation and vector control, and exacerbated by widespread malnutrition. For example from 75 to 90 per cent of people in developing countries are exposed to unsafe drinking water, giving rise to gastro-intestinal disorders that are the most

²Col. Kewal Krishna, *op. cit.*

³Ritchie Calder, “Man Must Save Himself”, *World Health*, August-Sept., 1971.

⁴Dr. C.C.A. Wallen, “Man Climate”, *World Health*, Nov. 1973.

important causes of illness and death in infants and children. Every year millions are stricken by mosquito and other insect borne diseases such as malaria, yellow fever and 'brain fevers' caused by many different viruses. In addition, trachoma (a cause of wide spread loss of vision), worms and other parasites, fostered by unsanitary conditions, affect entire populations in many developing countries in terms of reduced work capacity and lowered resistance to these diseases."⁵

MAJOR HEALTH HAZARDS OF ENVIRONMENT

Tabulated below are some well identified major health hazards of the environment.

Table 13.1⁶

AGENTS OR POLLUTANTS AND THEIR POSSIBLE EFFECTS ON HUMAN HEALTH

<i>Agents or Pollutants</i> 1	<i>Possible effects on human health</i> 2
I. In Air	
(i) Oxides of sulphur in combination with airborne particles (smoke)	Aggravation of existing respiratory diseases and contribution to their development; impairment of lung function; sensory irritation.
(ii) Airborne particles	Increase in the effects of gaseous pollutants such as sulphur dioxide; possible toxic effects depending on chemical composition (<i>e.g.</i> , particles containing lead or asbestos).
(iii) Oxidants including ozone	Eye irritation; possible association with asthmatic attacks; impairment of lung function in diseased persons.
(iv) Carbon monoxide	By combining with haemoglobin deprives tissues of oxygen; individuals suffering from cardio-respiratory disease more sensitive; psychophysiological effects possible even at low concentrations; smoking is an important source, perhaps more significant than exposure to motor vehicle exhausts.
(v) Lead	Intake through food and water and air enhances the total body burden of this element; in excessive amount it may develop poisoning.
(vi) Asbestos	A possible factor in the incidence of lung disease along with other air pollutants and smoking; pleural calcification observed also in non-occupational exposure.
(vii) Beryllium	"Neighbourhood" cases of chronic beryllium poisoning observed near beryllium production plants.

⁵Dr. Martin Kaplan, "Environmental Hazards for Human Health", *World Health*, May, 1972.

⁶*Ibid.*

1	2
II. In Land	
(i) Human excreta	Schistosomiasis, taeniasis, hookworm and other infections.
(ii) Sewage	Urban filariasis; flies and other disease vectors.
(iii) Garbage and vectors inhabiting it	Rodent-borne diseases; pollution of water and air from disposal practices.
(iv) Industrial and radioactive waste	Effects from stored toxic metals and other substances through food chains.
(v) Pesticides	Contamination of vegetation and secondary food-stuffs and entry into food chain.

Table 13.27
AGENTS OR POLLUTANTS IN FOOD AND WATER AND THEIR POSSIBLE EFFECTS ON HUMAN HEALTH

<i>Agents or Pollutants in Food and Water</i>	<i>Possible effects on human health</i>
(i) Bacteria	Epidemic and endemic gastro-intestinal infections (typhoid, cholera, shigellosis, salmonellosis, leptospirosis, etc.)
(ii) Viruses	Viral infections, e.g., epidemic hepatitis; possible eye and skin inflammation from swimming.
(iii) Protozoa and metazoa	Amoebiasis, schistosomiasis, hydatidosis and other parasitic infections.
(iv) Metals	Lead poisoning, methyl mercury poisoning (through food chains); cadmium poisoning (through food chains); arsenic poisoning ("Black-foot" disease).
(v) Nitrates	Infant methaemoglobinaemia (a condition caused by changes in the haemoglobin molecule).
(vi) Fluorides	Mottling of teeth when in excess.
(vii) Oil petroleum; phenols, dissolved solids.	Impaired potability.

AIR POLLUTION

Air pollution has been defined by WHO experts as "Substances put into air by the activity of man in concentration sufficient to cause harmful effect to his health, vegetation, property or to interfere with the enjoyment of his property. In the industrialised countries, power plants, industries, transportation are major sources of air pollution today. In the developing countries

⁷WHO Report by the Director-General to 24th World Health Assembly, April 1971, annex 2, p. 4.

open burning of coal, wood and dung as fuel and dust storms add to impurity of air. A short but intensive study of air pollution at Bombay, Delhi and Calcutta, carried out by air pollution division of the then CIPHERI in 1968 and 1969 indicated a concentration of dust in the atmosphere from two to five times greater than that of cities in Europe or North America.⁸ The amount of pollution produced is generally given in millions of tons per year of the major pollutants—carbon monoxide, sulphur oxides, hydrocarbons, nitrogen oxides and particulate matter. However, comparing different pollutants in terms of either parts per million or tons per day would be misleading because the undesirability of any pollutant may have little to do with the amount present in the atmosphere. To explain this point, one might quote the standards laid down in the Los Angeles County where the presence of 0.5 ppm of ozone (1/2 of one part of the pollutant in a million parts of air) in its atmosphere at any time brings the first alert of their air pollution warning system, but it would require 100 ppm of carbon monoxide to elicit similar response. In India, today, NEERI has set up a network of nine regional laboratories at Ahmedabad, Bombay, Calcutta, Delhi, Hyderabad, Jaipur, Kanpur, Madras and Nagpur. The centre at Nagpur is also a WHO Regional Centre for maintaining air quality and study of air pollution.

AIR SAMPLING TECHNIQUES AND INSTRUMENTS

Inspection and enforcement are the twin controls essential for control of air pollution. Measurement of effluent concentration either at predischage point or off site or at both places is necessary. The former is necessary to establish whether the prescribed "discharge limits" were adhered to and the later indicates if the "ambient concentration levels" are within the prescribed tolerance limits. The two measurements together will provide an index of the local diffusion potential and serve as a feedback information in overall control of air pollution. Standard sampling techniques and equipment is required to be used for collecting the data and for its proper interpretation. Amongst many methods of analyzing air pollution is a device called Ringlemann Chart which is used in the U.S.A. to determine the density of smoke. The chart provides four shades of grey numbered 1 to 4 besides white (numbered zero) and black (numbered 5). Each shade denotes 20 per cent increase in density of smoke. Thus number 0 would indicate clear skies, no. 1 as 20 per cent density of smoke, no. 2, 40 per cent and so on. Chemical apparatus are used to measure the concentration of sulphurdioxide and other gases.

THE EFFECTS AND EXTENT OF DAMAGE

The direct adverse effects caused by air pollution can be immediate as well as delayed. An unusual increase in air pollution can cause immediate rise in

⁸A.S. Kochar, "India Uses the Sun as an Ally", *World Health*, Aug.-Sept., 1971.

morbidity and mortality and the symptoms will be referable to respiratory system. In case the pollution is not intensive, it can cause irritation of exposed mucus membranes resulting in conjunctivitis, etc., and feeling of suffocation. Delayed effects are many and will vary depending upon the type of pollutant. Asthma, primary lung cancer, fibrosis of the lungs and bronchitis are some of the delayed effects, even genetic effects cannot be ruled out in case of radioactive and chemical substances. In addition to these direct effects, there are a large number of indirect or socio-economic effects like: increased medical costs, working days lost due to sickness, damage suffered by structures, cost due to additional illumination necessary in a polluted atmosphere, frequent washing of clothes and linen including their wear and tear, adverse effect on cattle and vegetation, etc.

WATER POLLUTION AND WASTE DISPOSAL

It has already been stated that 75 to 90 per cent of people in developing countries are exposed to unsafe drinking water. Even in the bigger cities, controls over discharge into rivers are so few and fragile that almost no pollution control is possible. We start seeing only when dead birds and floating fish in rivers throw up a warning that pollution has far exceeded the permissible limits. This has happened more than once in the capital city of Delhi at Okhla. "Agra, the city of Taj Mahal fame, may well be drinking Delhi's sewage", is an example that Professor S.J. Arceveala of the Public Health Engineering Research Institute at Nagpur, likes to quote. Recently in "Janakpuri", a colony claimed to be the largest in Asia, suffered an epidemic of jaundice in which some people lost their lives and many have suffered irreparable loss to their human machinery. The pollution in this case occurred through water mains which were laid through manholes of sewerage system. The sewerage system itself in the entire colony does not function, since the sewers have collapsed at dozens of places. At one time thirty six pumps were employed to lift already overflowing sewage into open storm water drains. The outfall level of the main storm water drain was higher than the level of the nalla which was ultimately supposed to receive the storm water. The raw sewage spreads around this biggest human habitat in Asia and the flies, mosquitoes, rats and birds carry the hazards far and wide. Considerable quantities of sewerage seep down the soil and mix with underground water, waiting to be pumped up in the surrounding villages. In another instance large size pressure mains carrying city's water supplies to the south and beyond, are buried under city's garbage dumps. Those who raise a voice are never heard. The attitude of every one around gets coarsened and people continue to survive ailments and epidemics.

Only recently 600,000 people were shifted to resettlement colonies spread over an area of nearly one thousand hectares. These colonies were developed in a period of seven months with dry toilets and storm water drains which

follow a zigzag pattern presumably adopted to allow the storm water to partly evaporate in the atmosphere and partly seep through the soil. The entire area, as indicated by contours in the maps of Survey of India, is situated in a bowl or a saucer. A completely untenable explanation is offered to the effect that this 1000 hectare bowl will be drained with the help of syphons under the Hindon cut into the adjoining state of Uttar Pradesh. Even if we concede for the sake of argument that such a syphon would work, why should the state of Uttar Pradesh be ready to accept these flood waters? The entire arrangement is declared satisfactory only because the roads (built above the flood level) remained dry during one monsoon test. The surrounding grounds and pits which are full of water continue to act as breeding places for flies and mosquitoes. Any development has to foresee situations which may occur after years and those situations have to be studied thoroughly before such large scale settlements are undertaken. What will happen to this 1000 hectare saucer when the adjoining Jamuna and other canals are also in floods and it rains heavily in that area after urbanisation, can be well imagined.

POLLUTION IN VILLAGE WELLS

Nearly 80 per cent of India's population lives in villages and open wells are the source of drinking water in most of these villages. Surveys carried out indicate that most of these open dug wells are polluted. Since the well is used for all purposes including washing clothes, bathing and also because the drainage system around the wells is not proper, even faecal contamination has been noticed. The enteric diseases take a toll of human life in India at the rate of about 360 per 100,000. This is mostly due to contaminated water and absence of adequate sanitation and sewage collection and disposal system. Although the Public Health engineers at Nagpur have evolved a design with which an open well of about 4,500 litre capacity having draw-off rate of about 400 to 450 litres per day can be chlorinated through a double cylindrical pot filled with a moistened mixture of bleaching powder and coarse sand, its application on a large scale in the vast rural areas of the country is no where in sight.

There are many methods of dealing with sewage treatment besides the well known conventional methods. These are: oxidation or stabilization ponds, oxidation ditches for extended aeration and mechanically aerated lagoons, etc. These cost much less than the conventional systems and are easier and cheaper to maintain.

POLLUTION BY SOLID WASTE

Solid waste collection and disposal methods adopted in the developing world including India only add to the overall problem of pollution. The

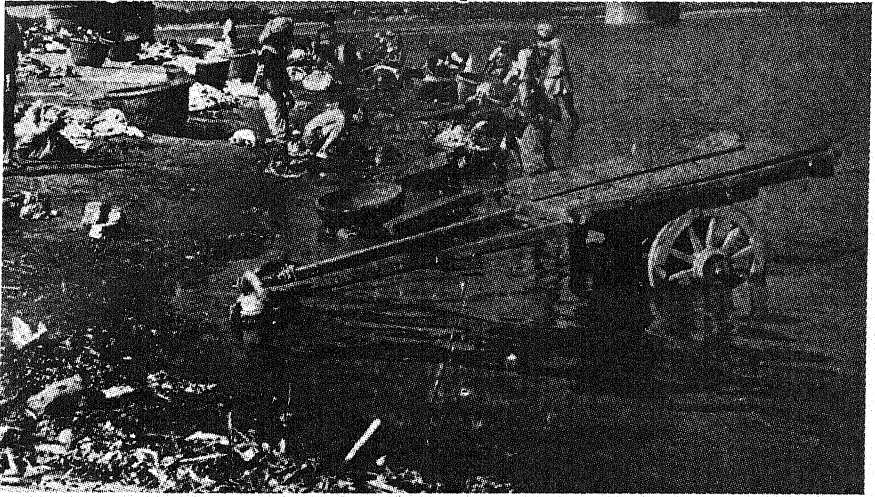


Fig. 13.1. Pollution of River



Fig. 13.2. A Collection Point for City's Garbage. Animals and Pickers around it in Search of Some Useful Material like Bottles, Rags, Food, etc.

garbage from households is collected in drums or masonry structures situated at convenient places in each locality and then carried in trucks to the ultimate point of disposal. If you watch the operations at each point of handling it would reveal how pollution is spread throughout the city. The presence of cattle, pigs and dogs at these masonry or drum type collection points is a common sight. These animals come in search of food and having had their fill proceed to roam around the city spreading the dirt and germs that cling to their bodies. Since these structures are open at top, the vultures and birds dive down, pick the garbage and take to wing, soaring high in the sky and dropping part of their collection into the atmosphere. The flies, mosquitoes and other insects including rodents have a field day. Similar is the story at disposal points with an addition of 'pickers' who come to collect and pick whatever useful material they can find in form of bottles, rags and some times food. They go home with their loot and in the process spread pollution in form of germs and dirt. When the garbage is lifted from transfer points and loaded into the waiting truck the manual process comprises of loading it into a basket and after lifting it head high, the basket with a rotatory motion is emptied into the truck. This process itself helps spread the germs and bacteria in the atmosphere. Often the trucks carrying the garbage are open or at best partly covered with a tarpauline which hardly prevents the garbage from falling down on the road or flying off into the atmosphere. Most of the disposal points are nothing else but crude dumps often misnamed as sanitary land fills. In a recent survey carried out by the Government of India, of 341 cities towns, it was seen that the municipalities employed 89,934 persons on conservancy services to serve a total population of nearly 31 million. On an average 2.8 persons served 1000 population and the break-up of their functions was as follows:

(a) Collection	2.3 persons per 1000
(b) Transportation	0.3 persons per 1000
(c) Dumping	0.2 persons per 1000

The above figures reveal that the system is more biased towards collection of garbage up to the bins—a function which should normally be performed by the citizens themselves than by the municipality. If this is done the municipality would be left with enough finance to streamline and improve the collection, transportation and disposal methods and make them pollution free.

INDUSTRIAL POLLUTION

Many developing countries are placing more and more reliance on industrialisation. It would be worthwhile to learn a lesson in industrial pollution from the western world. The experience of United States of America, United Kingdom, countries of Europe and Japan, where pollution hazards

could have been very much reduced had there been a careful watch in the early stages of industrial development and necessary standards, detection and control measure had been adopted. Prevention of pollution will be much cheaper than paying for its price once it has worsened the situation. India has already enacted the Water (Prevention and Control of Pollution) Act 1974. This gives adequate protection against indiscriminate disposal of solid wastes into water courses. Its implementation has yet to achieve the intended results. There is, however, no legislation to prevent other sources of pollution caused by solid industrial wastes. As a solution, some people talk of turning off the switch of technological process. Only immature persons talk about returning to a "state of nature". A state of nature is one in which "infants die for lack of elementary medical care, in which malnutrition stultifies the brain, in which, as Hobbes reminded us, the typical life is poor, nasty, brutish and short."⁹ To turn our back on technology would be suicidal. At the same time we must take steps to protect the urban areas from the myopic outlook of technocrats. Their instinct is to think about only the immediate results and consequences. They believe in Fitzgerald's version of "take the cash and let the credit go". If the region needs electricity, they react for a power plant. The fact that such a plant might sharply alter labour patterns, that within a decade it might throw men out of work, face large scale retraining of workers and swell the social welfare costs of nearby city such considerations are too remote in time to concern them. The fact that the plant could trigger devastating ecological consequences a generation later simply does not register in their time frame."¹⁰ This is when the administration should step in and ensure that in our haste to milk technology for immediate economic advantage, we do not turn our environment into a physical and social tinder box. India is still in an early stage of industrialisation, but its harmful effects on the environment have already started showing signs. Nine years ago, "the Barauni Refinery incident or the 'Ganges in Flames' which happened in March, 1968 is still fresh in the minds of the people, at least those of the Monghyr Municipality. Here the oil discharged from the Refinery into the river Ganga caught fire and the water supply to the residents of Monghyr had to be suspended. The Commission which enquired into the matter fixed the responsibility squarely on the Refinery authorities and recommended substantial damages to the Municipality whose protected water supply was affected for some time."¹¹

The atomic and thermonuclear explosions both in air and underground or under water have posed yet another threat to human environment. The recent search for nuclear power to meet the future demands of world electricity indicates that about 700 nuclear power stations will be functioning in different

⁹Alvin Toffler, *Future Shock*, Pan Books Ltd., London, 1970.

¹⁰ *Ibid.*

¹¹M.K. Balachandran in "Law in Relation to Environmental Pollution" presented at the seminar held by CMA in the Indian Institute of Public Administration, April 27-28, 1973.

parts of the world by 1980. One has only to imagine the amount of strontium and large scale poisonous gases which will pour into human environment causing cancerous diseases. The major source of worry has been strontium 90 — a high quantum of which is contained in nuclear power reactors. The life time of such an element is long and extends to a period of 28 years. The full impact of its damage, thus, will be known only in time to come.

For combating pollution from industries there can be different measures. Settling chambers for smokestacks or chimneys, to allow particles in gases to settle through gravity, baffle plates, cyclone chambers, automatic stokers and smokeless fuels are some of the devices which help reduce smoke pollution. Electrical precipitators or electrostatic precipitators are particularly helpful in removing particles of less than one micron in diameter. Removal of certain harmful gases from smoke by making them pass through a spray of water is yet another device known as scrubber. Building tall chimneys or smoke stacks helps in discharging gases high in the air so that these get diluted and do not cause trouble unless a temperature inversion causes them to be trapped in what is called smog. By providing improved combustion in motor car engines or by installing after burners, one can prevent the escape of unburned gasoline from exhaust pipes.

The use of chemical fertilizers in agriculture industry and DDT in protecting the food and fibre production has been under a vitriolic attack from a group of environmentalists who predict end of the world by chemical poisoning. Dr. Norman E. Borlang who was awarded the Nobel Peace Prize in 1970 for his work in developing high yield wheat strain—a development popularly known as Green Revolution—strongly opposes this approach and feels it is a one sided attack on the use of pesticides and chemical fertilizers. “The continued success of the Green Revolution”, he says, “will hinge, however, upon whether agriculture will be permitted to use the inputs—agricultural chemicals including chemical fertilizers and pesticides—absolutely necessary to cope with hunger. If agriculture is denied their use because of unwise legislation that is now being promoted by a powerful lobby group of hysterical environmentalists, who are provoking fear by predicting doom for the world by chemical poisoning, then the world will be doomed—but not by chemical poisoning, but from starvation.”¹²

NOISE POLLUTION

Blaring of loud speakers at all unearthly hours, hammering sounds from industries or pile driving machines, honking of motor vehicles, breaking of sound barriers by aircraft are some major sources of noise pollution in an urban area.

¹²Dr. Norman E. Borlang, “Where Ecologists go Wrong”, *The Sun*, Sunday, Nov. 14, 1971.

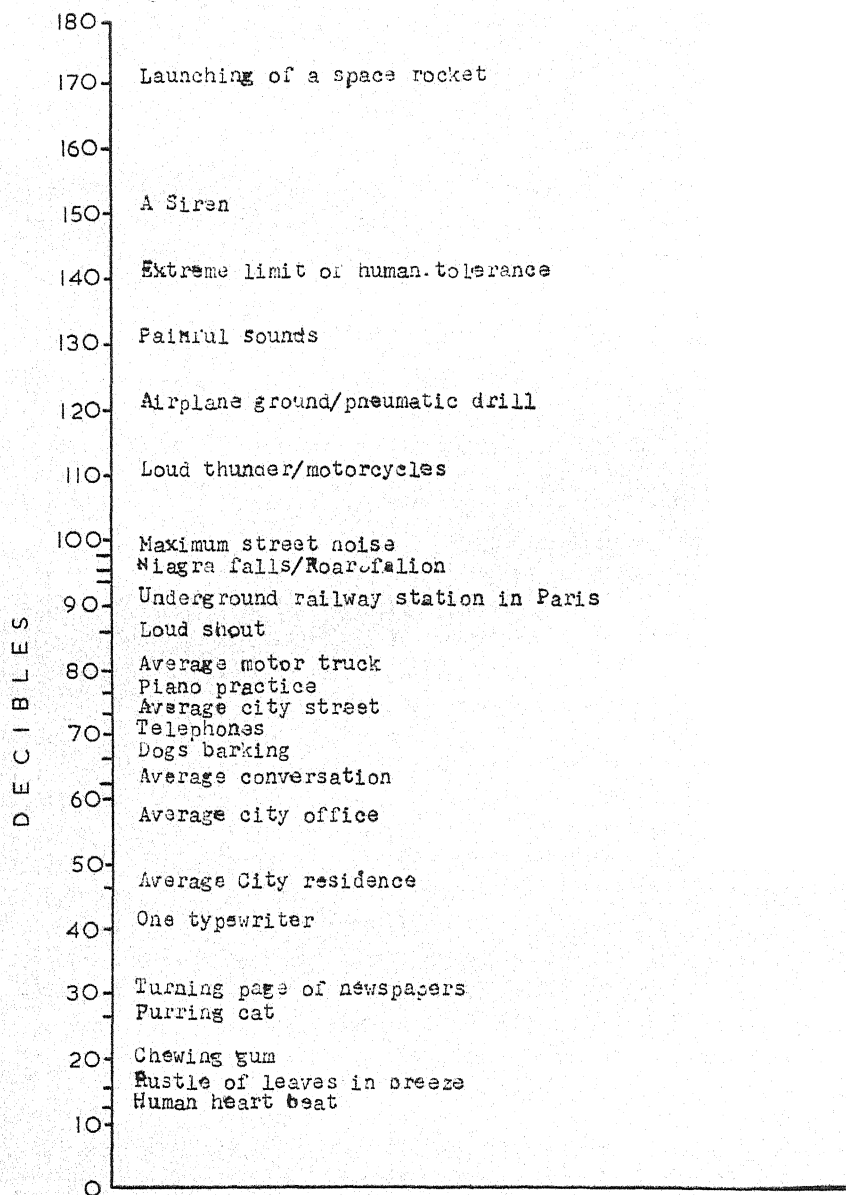


Fig. 13.3. The Noise Scale Marked in Decibels.

Noise may be defined as "any nonmusical sound", its intensity is measured in units called decibels. A decibel is a tenth part of a bel, a unit named after Alexander Graham Bell, inventor of the telephone. If we were to draw a "noise scale" in decibels, an intensity of about 130 decibels would be considered as a painful sensation in the ear. There can be any number of measurements made with sound meters. Whereas a human heart beat has an intensity of about 15 decibels, a typewriter records 40, an average city office 55, an average city street 75, a motor truck 80, a loud thunder and a motorbike 110, a pneumatic drill 120, a siren 150 and launching of space rocket 170 decibels. Variety of such sounds combine together in an urban area and bring one nearer to pain threshold. (see Fig. 13.4 of average human ear's sensitivity to tones of different pitches and intensities).

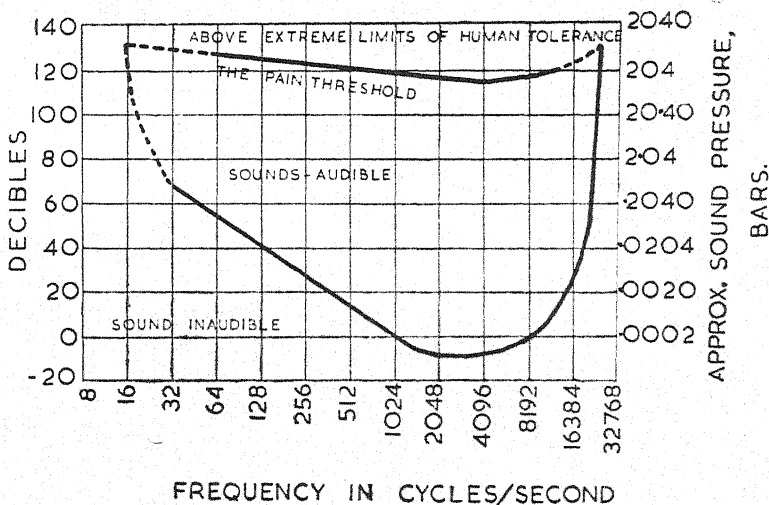


Fig. 13.4 Average human ear's sensitivity to tones of different pitches and intensities.

The loudest known noise is reported to be that of explosive eruption of the volcano of Krakatoa between islands of Java and Sumatra. Although this happened in 1883 when there were no soundmeters, the sound is reported to have been heard some 3000 miles away and is estimated to have had an intensity of 190 decibels.

Reverting to the "decibel hell" that an urban dweller has to go through, it will be seen that motor bikes, pneumatic drills, pounding machinery, aeroplanes, sirens, street noise, etc., have enough decibel intensity to make him suffer on that account. Epidemiological research in USA indicates that one suffers from hearing loss sooner in cities than in rural surroundings. The high decibel level can also produce tachycardia and the blood pressure rises followed by constriction of blood vessels. It also makes concentration on

mental work difficult and one is apt to make mistakes thus affecting the efficiency and accuracy of workers in such conditions. Martine Allain-Regnault in his article "The Decible Inferno", reports "In December 1971, WHO organized a meeting on urban and occupational noise attended by ten consultants from eight countries in Europe and North America. They reviewed the effects of exposure to noise on human health and examined the possibility of establishing a common noise exposure index that would incorporate all physical characteristics of noise having significant biological effects, and could be internationally accepted for measuring exposure to both community and industrial noise. This would be an essential step to enable governments to take effective measures to protect their populations against growing threat of pollution by noise".¹³

THE LAW AND POLLUTION

The need for legislation and other measures to control pollution is today recognised throughout the world. The problem, however, is not an entirely new one. To combat smoke pollution, Romans as far back as 1273, enacted legislation against use of coal. John Erelyn in his famous book "Fumifugium", addressed to Charles II, advocated (fruitlessly) measures to be adopted against smoke pollution. He was against use of bituminous coal and peat on large scale for heating in London. Descriptions of George Cheyne about London in 1733 and Le Begue de Presle, Jean-Jacques Rousseau's last physician about Paris in 1763 describe both cities as awfully polluted. With development of steam engine in 1698 and industrial revolution during 1760-1830, air pollution became a widespread problem. The English set up a Commission in 1881 and so did the French and German to examine this problem in detail. United States of America was the first to declare smoke as nuisance in 1864. The French Imperial Decree issued on October 15, 1810 is perhaps one legislation that has been extensively utilised in Western Europe and Latin America, Africa and Asia. It classifies industries in three categories: (1) Those that should be located away from residential areas, (2) those that should come up subject to certain specified circumstances, and (3) that are classified as non-nuisance industries. In England the earliest ordinance came in 1306, followed by "Alkale, etc., Works Regulation Act" in 1863. As a direct result of the 1952 London Smog came "Clean Air Act" in 1956. This act was later amended in 1968 and establishes smoke controls areas in addition to controlling pollution due to smoke, dust and impurities in air.

Pollution menace in India is still largely considered a local problem and the municipalities are called upon to take necessary action under various provisions made in their Acts. Pollution as such is not defined or dealt with in these Acts but provisions to prevent various 'nuisances' are aimed at

¹³Martine Allain Regnault. "The Decible Inferno", *World Health*, May, 1972.

combating pollution in local areas. These provisions in the Municipal Acts are often vague and ineffective. They are also not uniform. But before one goes to suggest a comprehensive legislation to deal with all aspects of pollution on national basis, it would be worthwhile to go through some of these provisions in existing Municipal Acts. A comparison of these provisions in the Gujarat Municipalities Act 1963, Delhi Municipal Corporation Act 1957 and Calcutta Municipal Act 1951 will give a bird's eye view of the existing laws in most of the Indian cities to deal with this problem.

The word "nuisance" as defined in the Gujarat Municipalities Act, 1963, Section 2(15) includes "any act, omission, place or thing which causes or is likely to cause injury, danger, annoyance or offence to the sense of sight, smelling or hearing or which is or may be dangerous to life or injurious to health or property". The Delhi Municipal Corporation Act 1957 and the Calcutta Municipal Act 1951, provide a somewhat wider scope by including the words "or disturbance to rest or sleep" after the word "hearing" in above definition. It would be appropriate to reproduce below the gist of relevant portions of Sections 192(1), 192(2), 193 to 195, 200, 201 & 203 which provide powers to the municipality to prevent nuisance:

Section 192(1): the depositing of rubbish, filth, etc., or committing any nuisance in any street, drain or on the bank of any river, water course, etc., or any public place other than where it is permitted to be deposited under the Act, is prohibited,

Section 192(2): the committing of nuisance in any sewer, drain or water course or in such close proximity thereto as to pollute the same is prohibited,

Section 193: the discharging of sewage, etc., from any building or land to any street or open space, etc., so that it is likely to be offensive or to remain stagnant is prohibited,

Section 194: the keeping of any dirt, filth or nightsoil or any noxious or offensive matter in any land or building by the owner or occupier except in some proper receptacle, for more than the prescribed time, is prohibited,

Section 195: the removal of any night soil or other such offensive matter other than during permitted hours and streets is prohibited,

Section 200: the washing of clothes by washermen except at places appointed for the purpose is prohibited,

Section 201: the fouling of water by bathing in any stream, pool, tank, reservoir, etc., or by doing anything whereby the water therein is fouled or corrupted, is prohibited,

Section 203: the use of nightsoil or other manure or substance emitting an offensive smell is prohibited.

It would be seen from above that the entire gamut of air, water and solid waste pollution stands covered under these provisions. In addition to this Section 206 of the Act empowers the municipality to control smoke nuisance if any, results in pollution. The Calcutta Municipal Act 1951 also provides powers under similar sections 2(50), 436, 436(1)(b), 438(2), 439 and

583. The Delhi Municipal Corporation Act 1957 deals with these problems under Sections 2(33), 416(2), 417(3), 418(2), 419 and Section 481 further empowers the Corporation to make bye-laws regarding the elimination of trade effluent before it enters the municipal drain, its permissible quantity, rate of discharge, temperature, etc. Smoke coming out from factory chimneys can be taken care of under Section 481(j)(19).

But all these provisions are observed more in breaking the rule than following it. For lack of properly laid down standards against pollution, trained field staff, inadequate supervision and punitive punishment to offenders all these provisions have only academic value. Often when offenders are prosecuted day after day, the courts lump the prosecutions together and impose paltry fines. It is convenient for a factory owner to continue emitting smoke from a cheap machinery and pay the fine than make amends at a huge cost. This in turn results in corruption of all forms between the enforcing inspector and the factory owners. In addition to these provisions under Municipal Acts there are a few more in the Indian Factories Act 1948. The factories, under this Act are required to make effective arrangements for waste disposal and effluents. Respective states are required to make rules under this provision. Although this has been done, the same makes general provisions for getting their arrangements approved either from respective local authorities or public health directorates. No proper standards have been spelt out for such discharges which in turn makes enforcement ineffective and inefficient. Maharashtra is perhaps an only state which has passed, a Prevention of Water Pollution Act in 1969, safeguarding their streams and rivers. Besides other things it envisages constitution of a Water Pollution Control Board which will frame necessary standards of quality of water, carry out investigations, provide training facilities and advice the government on all connected issues.

It will be seen from the above that the need for national legislation is obvious. The Indian Parliament has already enacted "the Prevention of Water Pollution Act 1974" and the Government of India proposes to bring up legislation for "Air Pollution Control". The present position regarding these two legislations is as under:

"The Prevention of Water Pollution Act, 1974.

Since the existing legal provisions dealing with pollution were found to be inadequate and unsatisfactory, the Government of India had set up a Committee in 1962 to draw up a comprehensive legislation for the prevention of water pollution. The Central Council of Local Self-Government considered the report of the Committee and resolved that a single law regarding the measures to deal with water pollution control, both at the Central and State levels, should be enacted by Parliament. A draft Bill was accordingly prepared and was introduced in the Parliament in 1969. The Bill has been passed by the Parliament in 1974.

The Act envisages *inter alia* the constitution of a Central Board and State Boards, the defining of water pollution prevention areas, provisions for

penalties for contravention of the provisions of the Act and setting up of water testing laboratories at the Centre and in the States.

The main function of the Central Board is to promote cleanliness of streams and wells in different areas of the States. Other functions include the rendering of advice to the Central Government on prevention of water pollution, the coordination of the activities of the State Boards and resolving of disputes among them and providing of technical assistance and guidance to state Boards. The Board is empowered to exercise the powers and functions of a State Board in respect of the Union Territories. The Act does not provide for the representation of local authorities in the Central Board.

Local authorities are, however, represented in the State Boards. The functions of these Boards, *inter alia*, are to plan a comprehensive programme for the prevention of pollution of streams and wells and to advise the state government, local bodies or industrial undertakings on matters relating to prevention of water pollution.

Section 20 of the Act seeks to prohibit the use of stream or well for the disposal of polluting matter. Section 21 requires the prior consent of the State Board for the discharge of trade or sewage effluents or wastes into a stream or well under certain circumstances. Section 26 deals with emergency measures.

Section 45 seeks the assistance of local authorities for the discharge of the functions of the Board.

Air Pollution Control Legislation

The proposed legislation on air pollution control is likely to cover all sources of pollution such as industries, transport, railways, automobiles, diesel vehicles as well as domestic fuel with extensive powers to the Board to be constituted under the Act for effective action. It envisages strict penalties for atmospheric polluters.

The legislation envisages the setting up of Air Pollution Control Boards in the Centre as well as in the States with powers to issue and revoke licences to polluting industries, enforce emission standards and to frame rules and regulations for the control of air-pollution. The legislation, it is reported, is primarily directed against the 12 highly polluting industries—called Scheduled Industries such as Iron and Steel, Textile and Power plants. The second target is to notify certain heavily polluted regions as 'air pollution control areas' where any further pollution would become a severe health hazard to the people. The Boards will have power to prohibit certain trades and manufacturing processes in notified areas and prescribe emission standards in scheduled premises. The legislation is also understood to seek to ban the burning of garbage and other waste products in urban areas as well as the fouling up of the air by burning smoking fuels for domestic purposes."¹⁴

¹⁴M.K. Balachandran in "Laws in Relation to Environmental Pollution" presented in a Seminar held in the Indian Institute of Public Administration, New Delhi during April 27-28, 1973.

Many in this country believe that pollution is a local problem and has not assumed national or even regional dimensions. The comparisons are drawn with industrialised countries like Japan and USA where entire rivers and lake areas have been polluted and people are called upon to wear masks when extent of pollution crosses a particular limit in industrialised cities like Tokyo. It would not be advisable to wait and let the situation worsen. Already major cities in India are throwing up signs of degradation in quality of life which bring out in bold relief the necessity of timely measures to be adopted at a national and regional level. Others argue that legislative measures are ineffective. To their attention one might bring the Clean Air Act 1956 of London which has brought more sunny days to that city than it had witnessed in the past and decrease of smoke by nearly eighty per cent. What is required is to work out standard methods for analysis and measurement of pollution in various fields. Acceptable norms, standards and permissible limits of pollution which have to be practicable in application and enforcement is the foremost requirement before a law is enacted. The law should also be public oriented and there must be agreement in principle between the legislation and those for whom it is legislated.

ADMINISTRATIVE CONTROL

Unfortunately, the municipal organisations today which are required to enforce existing provisions against pollution are themselves the major polluters. Their own outdated methods of solid waste management, the crude dumping grounds, the inadequate drainage systems which carry raw sewage along with sullage, their polluted water sources, their inadequate administrative machinery to control chimneys belching black smoke throughout the day and their own power houses pouring out fly ash in tons in addition to black smoke are some of the glaring examples as to how the controlling authorities help spread pollution in cities. Often the blame is placed on inadequate finance available with these organisations. Be it so, the fact remains that the problem is beyond control of these city governments. A question is asked that as and when the national legislations on water and air come through, will the erring municipal bodies be prosecuted in case they continue to pollute the cities. Balachandran quotes an English case where the Corporation was held liable to the claimants whose fishing rights were seriously injured by the pollution of the river carried by Corporation's inadequate sewage disposal system. The court said: "their act in pouring a polluting effluent into the river makes them guilty of nuisance . . . (they have) no authority to pour into the river an effluent which was noxious or polluting." (1953 1 All E, R. 179 (CA)). In India, recently a case was reported from Andhra Pradesh where the High Court has held (Oct. 11, 1972) that the municipality could be prosecuted under the Indian Penal Code for causing public nuisance by systematically neglecting its duty to maintain cleanliness in the town.¹⁵

¹⁵M.K. Balachandran, *op. cit.*

Pollution whether in air or in water does not restrict itself by local or regional boundaries. In fact the problem has so many facets (some of which we have examined in this chapter), that the lead must come from the centre and regions and local areas involved intensively in tackling the problem. The U.S. Federal Water Pollution Control Act, as amended in 1970, declares it to be the policy of Congress to provide Federal Technical Services and financial aid to state and interstate agencies and to municipalities in connection with the prevention and control of water pollution. It is conceded that the pollution problem in that country has reached tremendous dimensions, but let us not forget that the local bodies and state governments in that country are far stronger than those in our country, financially, administratively and in technical know-how. Yet the lead there has come from top. On 1st January 1970, the American President said: "the 1970s must be the years when America pays its debt to the past by reclaiming the purity of its air, its waters and our living environment. It is literally now or never." Same was the urgency expressed by India at the United Nations meet at Stockholm. The need to improve and strengthen the machinery at all levels for the management and environment needs no emphasis. The administrative steps are many. One may quote here only the most important ones:

1. Creation of agencies for air, noise and water pollution control at centre, state and local levels.
2. Working out standard methods of analysis and measurement of pollution.
3. Defining acceptable norms, standards and permissible limits of pollution.
4. Enactments on pollution control which should be public oriented.
5. Functions of local bodies and states should be clearly defined and they should be provided adequate financial and technical assistance.
6. Pollution control technology should be given a boost so that methods to retrieve situations could be worked out indigenously.
7. Setting up of laboratories for sampling, analysis and evaluation.
8. Locating new factories and relocation of existing noxious industries should be planned cautiously and in a most humane manner. Zoning of areas should take into account meteorological conditions.
9. Adequate stress should be given to improve equipment and fuel in industry. Use of smokeless fuel for domestic and industrial purposes could be encouraged to bring about low mineral matter and use of coked coal, etc.
10. Railways bring in considerable smoke into cities. Tracks within or near urban areas could be electrified or diesel engines used in specified areas.

11. Establishing green belts between industrial and residential areas helps increase the self cleansing capacity of environment. Work on creation of such green belts should be given impetus.
12. Warning signals whether attached to the industrial unit or specified predetermined locations should be so installed as to guide and inform both operators and enforcement staff that the pollution emitted is beyond permissible limits.
13. Training programmes both in service as well as at the time of entry, coupled with short-term courses in universities and institutions should be provided to encourage people to gain the necessary know-how in the subject.
14. A programme of public education both formal and informal fields of education for students and adults is essential so that public participation becomes meaningful.

The question of planning and distribution of authority and responsibility in this field assumes importance in the face of multiplicity of authorities and conflicting jurisdictions prevailing in our cities and regional areas. The decisions about locating industrial units are taken by authorities other than local and pollutants travel across the jurisdictional boundaries. Centre must provide the lead to combat the pollution nuisance at national level and states and local bodies must come forward to share and shoulder the responsibility in this common cause.

14

Quality of Life in Cities^{*}

No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable.

—ADAM SMITH

The Wealth of Nations, 1776.

For those millions in the developing countries who are ill-housed, ill-clad and ill-nourished, the phrase 'quality of life' is meaningless. There is a large section of people in the big cities of third world which remains half-starved and homeless in shanty towns, slums, uncontrolled settlements, surrounded by dirt and disease, always exposed to hunger, epidemics and vagaries of weather. It will be an impertinence to talk to them about this subject. The rightists would say that these people need help to be useful citizens. The leftists would say the situation calls for a revolution. The United Nations Habitat Conference on Human Settlements decided that "the first objective of the human settlement policies of every nation will be to secure a minimum standard of living, including provisions of all basic goods and services, to all its living and future people, and to restrain excessive consumption by privileged groups until such minimum standards are attained."¹ Such minimum standards may vary from nation to nation but broadly speaking for a developing country these would mean shelter, food and clothing, and an equal right to amenities and services. The list could be made longer—but then in a developing country it is difficult to draw a line where the basic amenities end and quality of life starts.

The former Prime Minister of India, Mrs. Gandhi observes:

"The quality of life has many meanings. In my grandfather's time it consisted of cultivated conversations and gay parties amidst rich materials, beautiful silver, exquisite carpets. By the time I reached the age of appreciation, these were all things of the past.

My father's sensitivity made him abhor all show and ostentation. My mother, too, though for a different reason. She was by nature simple to

^{*} The article is based on paper presented by the author along with Mayor of Delhi and Municipal Health Officer at 3rd Conference of Mayors of the World's Major Cities in Milan, 1974.

¹ Intergovernmental Working Group—DOC. A/CONF.70/WG/ 15th Sept., 1975.

the verge of austere. I grew up with only one thought: that nothing at all mattered without freedom. There could be no quality under the humiliating conditions of colonialism. This was an 'obsession' that gained wider dimensions after acquaintance with Western liberal thought. An obsession sears, but it can also inspire and strengthen. No one who has not shared the experience can imagine the intensity and all-pervasiveness of feeling. I was, of course, aware of the evils of our social and economic structure. Our own freedom struggle had generated a great movement for the reform of Indian society—to change the unequal rural structure, to eradicate the monstrous practice of untouchability, to bring about communal harmony, to defend women's rights. It was intolerable that some sections of the people should exploit others, or that a person should be condemned to inferior status by reason of his caste or sex, or that there should be any differentiation on account of religion. Once we had attained political independence, we were also free to deal with these questions. For freedom would be meaningless for the millions whose lives were overshadowed by poverty, inequality, and superstition."² The words are noble. One only wishes the actions to match the words.

Talking of inequalities, one must admit that in spite of the efforts made by various five year plans in India the inequalities between a small group of high income earners on one side and a large number of population below the poverty line on the other, persist. "When there exist side by side, in the same country, certain groups enjoying all the benefits of development and the majority who get only the crumbs, the quality of life is reduced not so much by the excess of riches in the luxury hotels and grand villas or the poverty in the back streets and slums, as by the inequality and injustice, the incomprehension, contempt and fear on one side, and the impotence, envy and indignation on the other; with inevitable accompaniment of political indoctrination, police action and stupidity serving to perpetuate injustice".³

It would therefore be seen that the quality of life is something more than mere material goods. "Quality of life may be defined as the set of all relations between the individual, the society in which he lives and natural environment, each element having its own character and needs"⁴. Let us examine some aspects of the character and needs of these elements from existing examples in different parts of the world.

ROLE OF OPEN SPACES IN AN ENVIRONMENT

Open spaces play an important part in urban life. Tracing the history of

²Mrs. Indira Gandhi in *Voices for Life*, edited by Don Moraes, *Youth Times*, August 22, 1975.

³George Fradier in *About the quality of Life*, a UNESCO publication.

⁴Working document for the second session of the Preparatory Committee, U.N. Conference on Human Settlements.

towns, one would observe that open spaces left in temple towns of olden days or around the market places of today have provided a meeting place for citizens both in an intellectual as well as cultural sense. These open spaces in fact are a means to provide a shape to the city.

In most of our metropolitan cities in India, instead of exploiting beautiful locations to enhance the quality of life, the same have been ruined due to various reasons which vary from city to city. Bombay was lucky to have a beautiful sea-front, hills and some lovely lakes. Most of the sea-front has been screened off from its inhabitants by construction of multistoreyed buildings running parallel to it. The speculators in land saw to it that the common man is deprived of his association with the sea. The location of the marine-drive and chowpati could have been planned in such a manner that series of open spaces could have reached the sea-front, around which the habitat could

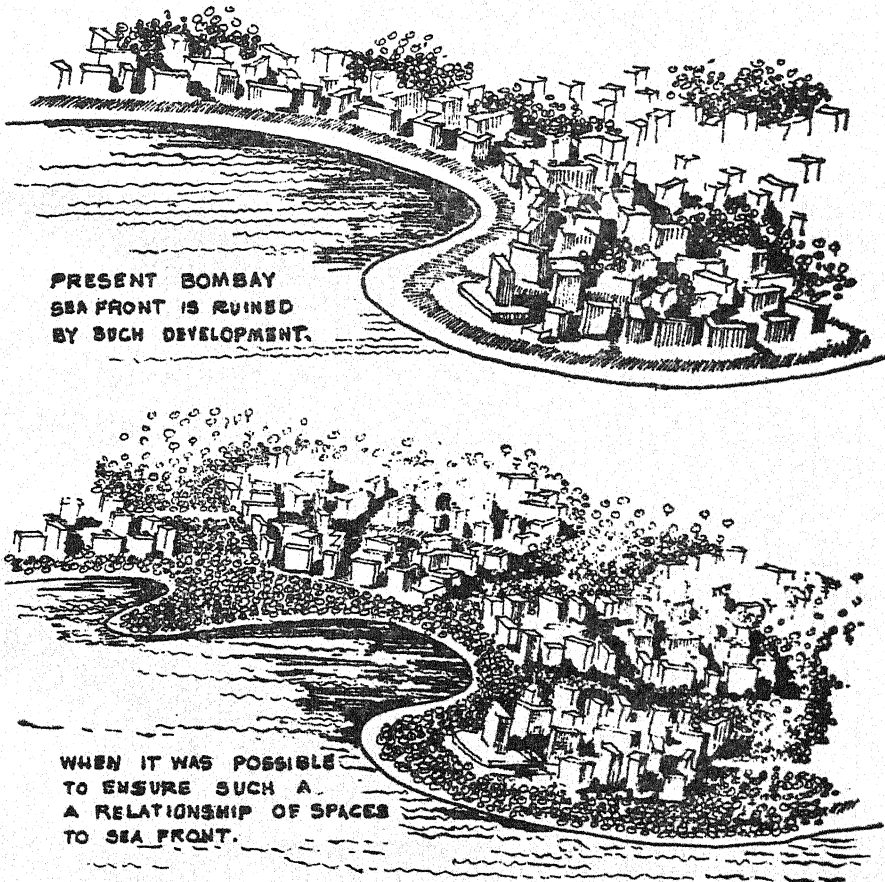


Fig. 14.1. Present Bombay Sea-Front and possibility.

Courtesy : Mr. A.P. Kanvinde, Member, Urban Arts Commission, New Delhi.

have grown. These continuous green tongues could have penetrated deep into the city avoiding suffocation, concentration, pollution and bringing a vast multitude of its citizens nearer to this valuable asset. Growth in the city of Delhi, in spite of its master plan, has also been lopsided. The stress on its growth was mainly in southern direction, ignoring the river front and ultimately re-settling its squatterers across the river—on land which was mainly 'green' and flood-prone. The land measuring 1000 hectares was developed⁵ in six months to accommodate more than half a million people away from their jobs and their social circle of friends and relatives. The psychological disturbances created are immense. Almost every member in the family used to be a wage earner in the old location. At their new place of settlement it is only the head of family who has retained the previous job and spends a substantial amount on transport in terms of money, time and energy. The quality of life for him has deteriorated because he is mentally upset, he is away from the circle of friends and acquaintances, he is financially poorer and the twenty five square yard plot can at best provide him with an ill-ventilated room and a cooking verandah—construction of which puts him under debt which he finds difficult to re-pay from his reduced net income.

The association of Calcutta's population with Hooghly river-front has been cut off on the same lines as Bombay's from its sea-shore. And Hyderabad's Husen Sagar Lake bears little relationship to its urban development. These are all cases of lost opportunities. Retrieval of open spaces for citizens must have high priority in city planning. Let us, therefore, see how this has been done elsewhere.

PEDESTRIAN MALLS AND GREEN AREAS

The east-west axis of central Munich has been transformed into a pedestrian zone and relieved of motorized traffic. Approximately 56,000 sq. meters of paved land has thus become available to its citizens for leisurely walks, shopping, rest and recreation and above all as a meeting place. This pedestrian zone has an atmosphere of gaiety which has been created by flower pots, fountains, colourful lamps and kiosks. It would be no exaggeration to call it Munich's 'Parlour'.

The town of Rabat jealously treasures its 'lung'—a green area of about 1300 hectares which is 11 per cent of the total area inside the perimeter of town. The green area works out to about 3.3 hectares for 1000 persons. Starting from the sea-line down to the oak forest, the town has maintained the green along with beauty spots in spite of all pressures of population explosion. This aspect of development is a lesson to be learned by other cities where such pleasures have been denied to citizens.

⁵For fuller description see chapter on 'Environmental Pollution and Urban Administration' in this book.

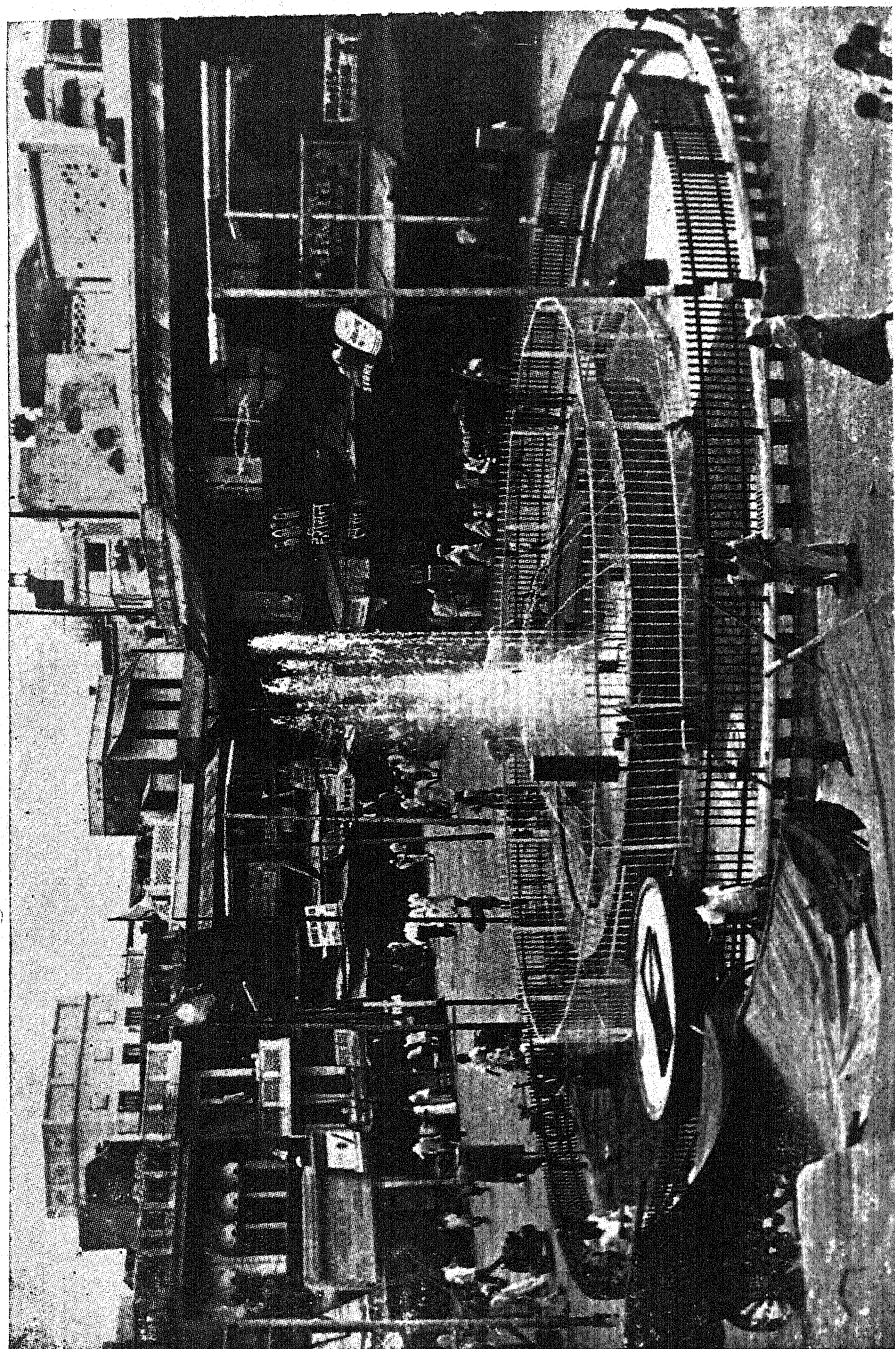


Fig. 14.2. A Water Fountain in a Congested Area
(Delhi witnessed a programme of city beautification in which hundreds of fountains were provided in areas both poor and posh, congested and open).

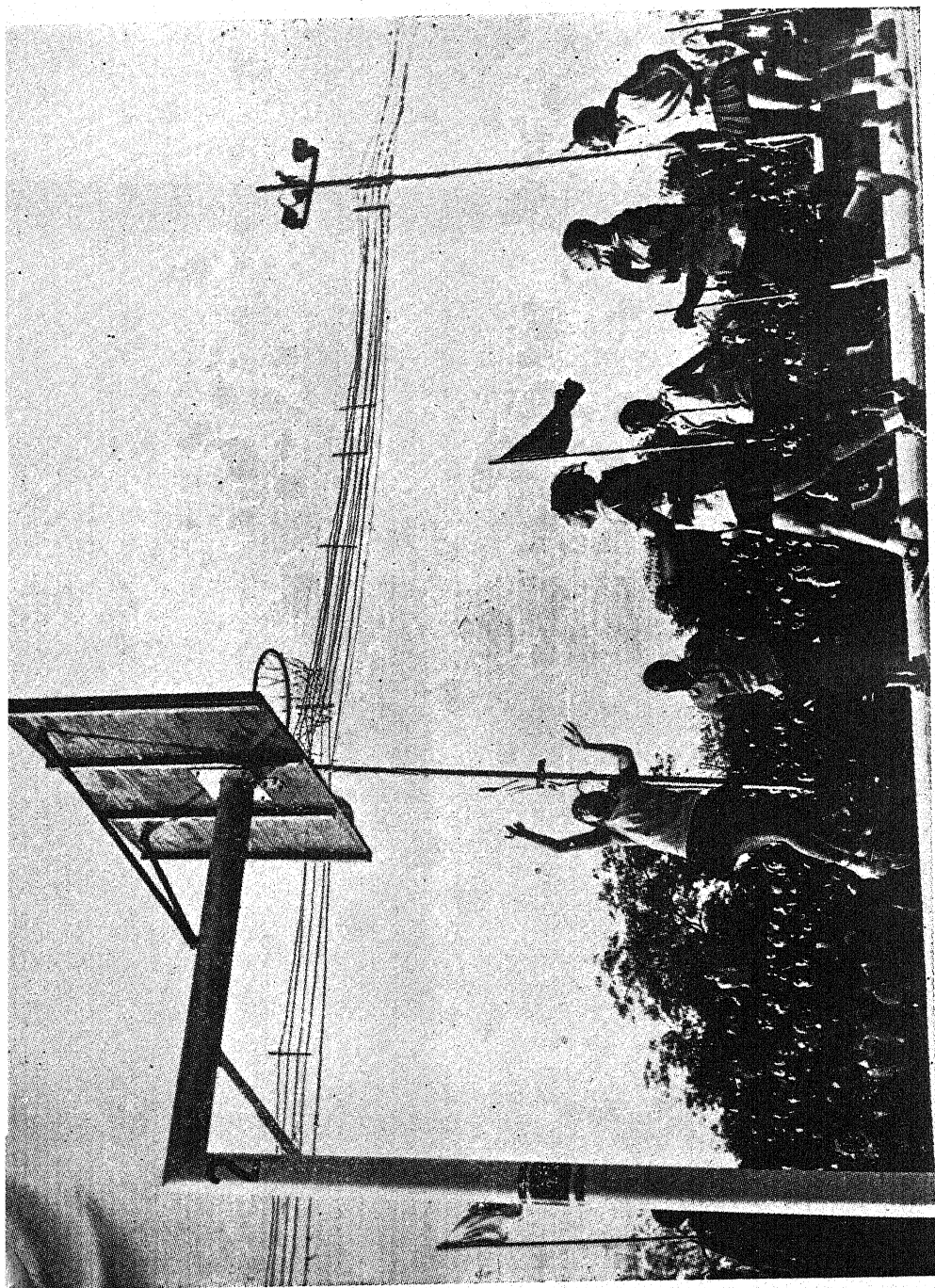


Fig. 14.3. A Play-Field

(Providing playgrounds and parks in a city go a long way to add to the quality of life of its citizens.)

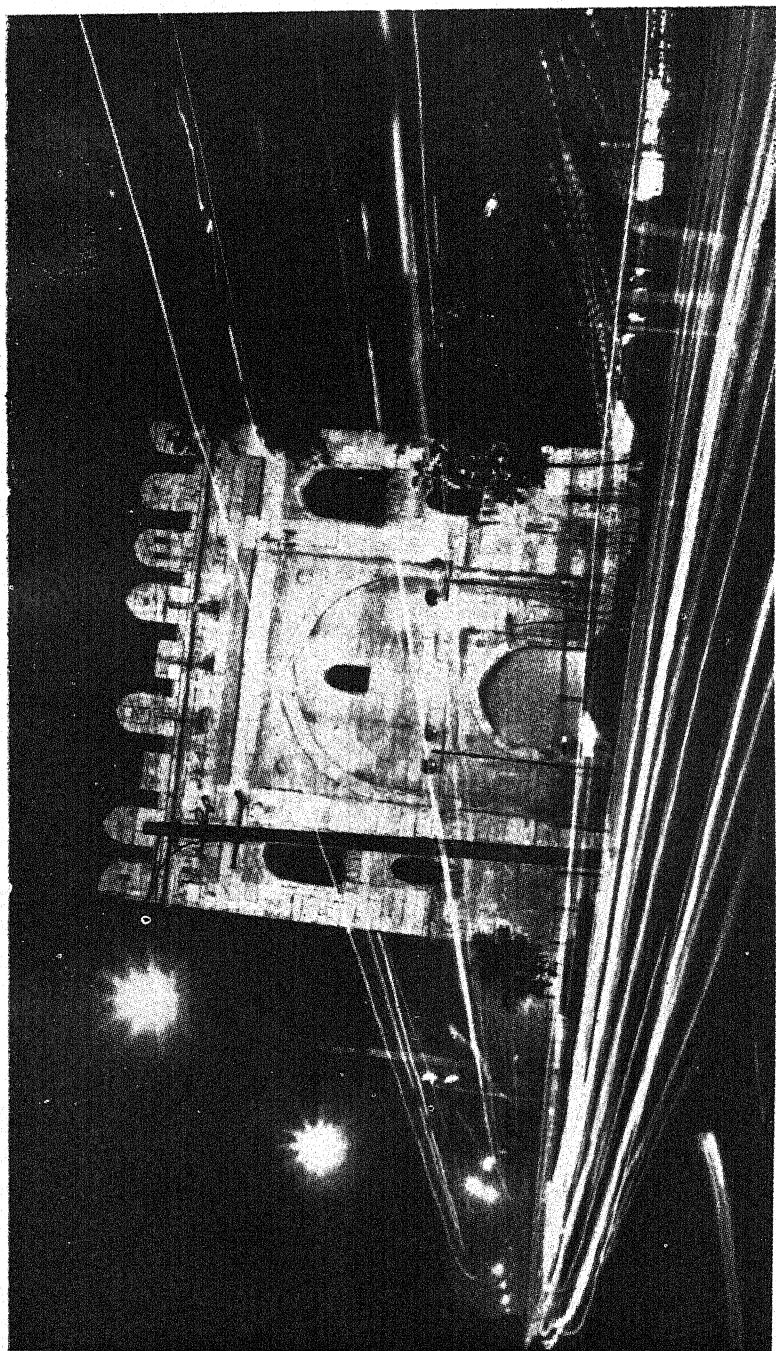


Fig. 14.4. A Lighted Monument.

(As a part of "city beautification" programme Delhi lighted up at night some of its monuments.)

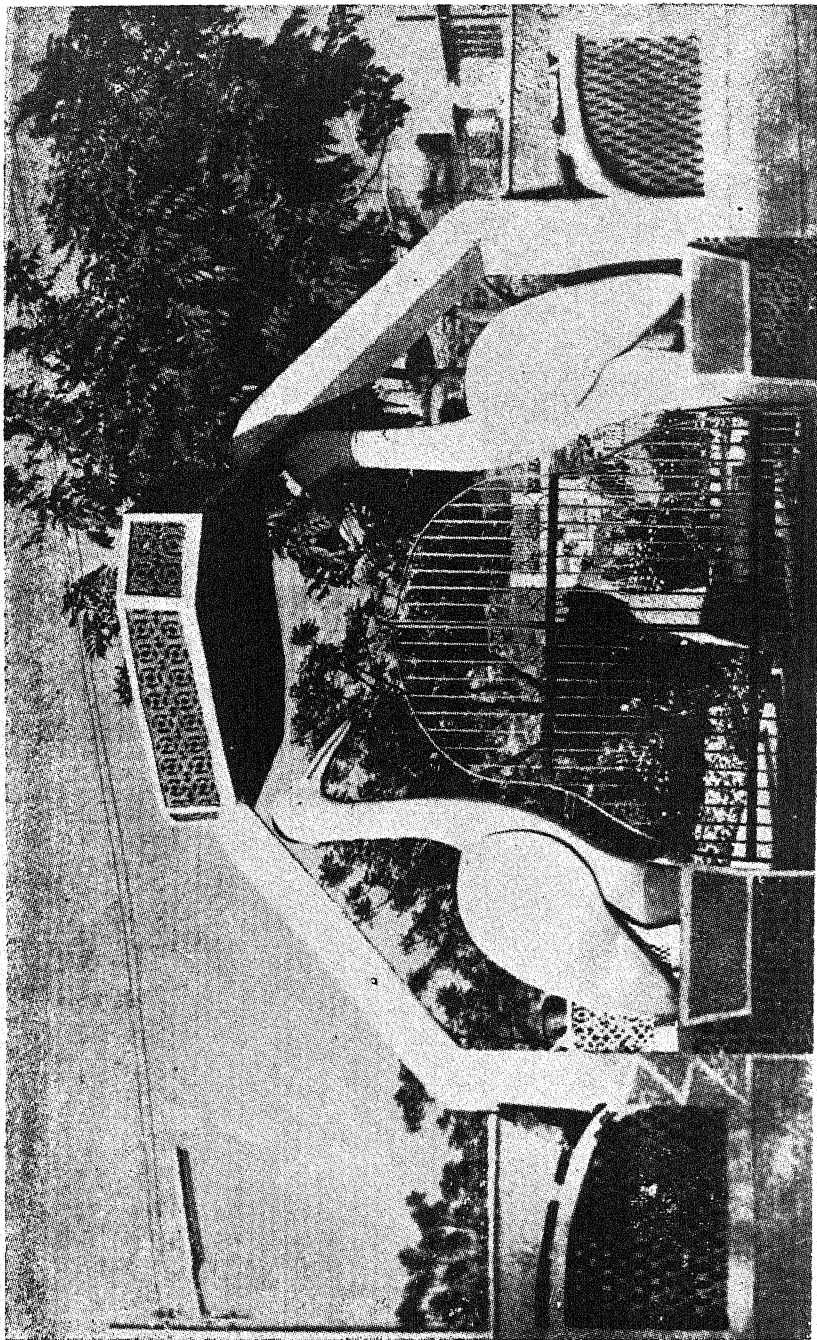


Fig. 14.5. A Concrete Gate to a Park. Some consider such works as—Visual Squalour.

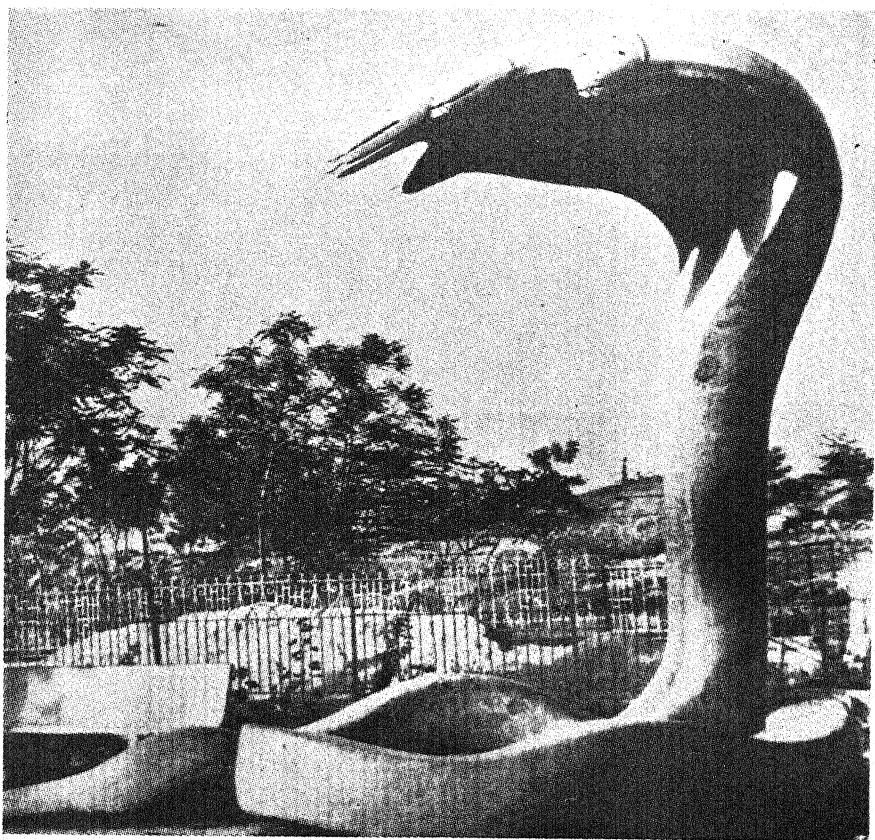


Fig. 14.6. A Concrete umbrella in the form of a Hood of a Cobra, in Children's Park could give sleepless nights even to mature adults if they chose to sit under it for a while.

The city of Warsaw didn't exist 35 years ago. It has been rebuilt over its ruins. Green areas covering more than 25 sq. kilometers, when fully developed will provide recreation for nearly 300,000 persons at a time with easy reach from residential areas. These have been thoughtfully interlinked with wood land and Vistula valley. This is a classic example of shaping the urban environment and protecting the natural one.

There has been some sporadic development of green spaces and playgrounds in Delhi. Although Delhi's Master Plan did indicate the lands earmarked as 'green', the development of these areas as green was neglected in the beginning and was left to various authorities, cooperative societies, etc. This resulted in large scale squatting of such public lands which complicated the matter further. However, the local government and the development authorities did provide a large number of parks, playgrounds and 'woodlands'. Delhi also witnessed a programme of city beautification in which hundreds of fountains were provided in areas both poor and posh, congested and open. There was considerable criticism at that time whether it was wise to misuse water in this manner specially when it becomes quite scarce in some areas during summer. On the whole it must be admitted that these measures did provide a face lift to the city. The water used in these fountains is circulated through pumping sets and it is not as if the water just goes down the drain. The colourful fountains, specially selected street furniture, lighting up at night the old monuments, playgrounds and parks did add a quality to the citizen's life in Delhi and the capital acquired the name of "City of Smiles". On the other hand some city fathers spent lot of funds on huge concrete gates to the local parks which many felt, helped to spread visual squalour in the city. They argued that such an expenditure was not justified in producing things which besides being not functional were also in poor taste as pieces of art. A concrete umbrella in the form of a hood of a cobra, in children's park could give sleepless nights even to mature adults if they chose to sit under it for a while.

URBANISATION AND INDUSTRIALISATION

Urbanisation is the twin-sister of industrialisation. The two together have created problems which man must hasten to solve. Around the year 1800 we did not have more than 50 cities in the world with the population above one hundred thousand inhabitants. This meant only 2 per cent of the total world population. Today the shanty towns of more than one hundred thousand inhabitants alone pock mark the modern cities and account for nearly 12 per cent of the world population. The world urban population today increases at the rate of 6.5 per cent per year which means that earth's urban population would stand doubled within a period of 11 years. The growth rate in technology has been equally astounding. In 1825 the first steam locomotive could muster a top speed of only 13 miles per hour whereas today men in space capsules are circling the earth at a speed of 18,000 miles per hour.

The growth rate in transportation, however, might undergo a fundamental change in the flurry of global concern about the energy crisis. "It is a sobering thought that 75 per cent of the automobiles on the roads carry only one person. A high proportion of these are in urban areas travelling back and forth on the same routes. Each of these cars occupies twenty times the space of one person. Far from being constructed for the simple short journey to work it is a highly complex vehicle". We have to look at the problem of urban transportation today beyond the realm of mass transportation. Smaller cars, car pools and various forms of mass public transportation systems are only measures to conserve the quantum of oil but these measures can not be considered as satisfactory answer to the problem. One must think in terms of cities which are spatial, mobile and expandable.

THE CITIES OF TOMORROW

Urban Planners and Architects have already started sketching sub-terranean cities and blue printed cities to be built on stilts over the ocean. The city of tomorrow has to be spatial, *i.e.*, it has to be erected at several levels. Such cities have to have mobility in a different context. The engineers should not confine themselves to rigid principles of mobility known till recently. The city of future should be designed in a flexible manner so that it can adopt itself to the ever-changing requirements of technology. The energy crisis through which the world is passing today indicates that although oil will continue to play a dominant energy role in next ten to fifteen years the future development will depend on the new sources of energy that will be developed. Whether the future sources of energy will be atomic, solar or of some other origin is too early to say. All new towns at present were designed in terms of motor traffic. It is difficult to say whether the future belongs to an automobile or to some other form of locomotion yet to be invented. The concept of spatial urbanism with artificial levels creating a multi-level town with suspended gardens and concrete slabs can help in creating a different type of mobility. Such ideas have yet to undergo the test of time but engineers must perfect techniques for flexible structures that are easy to put up and carry about. It is this type of mobility which would be more important. The television has already altered the life of an average man in the city and a telephone has cut down the number of physical contacts which were required for carrying out the same job in the past. Telecommunication, it is felt, will soon start taking the place of transport. The new generation of Architects and Town Planners must, therefore, think in terms of creating cities with artificial ground levels created by spatial structures. The cities of future will have several storeys separating various activities of the town like transport, shopping, etc. Yona Friedman's movable architecture of a three dimensional lattice on pillars with the conception of providing complete freedom on the ground surface, the pyramids designed by French architect Paul Maymont, consisting of a

hollow central mast containing vertical installations and linked by cables to the supporting ground work of the town and the Swiss architect Pascal Hausermann's plastic egg shaped cells which can be hung up in clusters, are some indications of these future cities.

THE SENIOR CITIZENS

Gerontology, the science of aging, is relatively new. A generation ago no one gave much thought to it. A generation hence it will be much more important than it is today. The traditional family structure is generally unchanged in the developing countries. Old people live with their children and grandchildren. They are respected as sages and their advice is valued. In the industrialised countries, the family normally consists only of parents and children.

Table 14.1

LIFE EXPECTANCY, PERCENTAGE OF POPULATION BY AGE GROUPS IN DIFFERENT COUNTRIES

Country	Life Expectancy at Birth*		Percentage of Population by Age Group in 1970†		
	Man	Women	0-14	15-64	65+
Austria (1969)	66.4	73.3	25	61	14
Belgium (1959-63)	67.7	73.5	24	63	13
Canada (1965-67)	68.8	75.2	31	61	8
Central African Republic (1963-64)	33	36	42	55	3
Chad (1963-64)	29	35	45	53	2
Chile (1960-61)	54.4	60	39	56	5
France (1968)	68	75.5	25	62	13
Gabon (1960-61)	25	45	33	61	6
Germany (Fed. Rep.) (1966-68)	67.6	73.6	24	63	13
India (1951-60)	41.9	40.6	42	55	3
Indonesia (1960)	47.5	47.5	45	53	2
Italy (1960-62)	67.2	72.3	25	64	11
Netherlands (1961)	71	76.4	27	63	10
Pakistan (1962)	53.7	48.8	47	50	3
Peru (1960-65)	52.6	55.5	45	52	3
Portugal (1959-62)	60.7	66.4	29	62	9
Spain (1960)	67.3	71.9	28	63	9
Switzerland (1958-63)	68.7	74.1	24	65	11
Togo (1961)	31.6	38.5	45	53	2
Yugoslavia (1966-67)	64.7	69	28	65 *	7

*SOURCE: United National Demographic Yearbook, 1970.

Dates in parentheses indicate years covered by national surveys.

†SOURCE: UN Population Division, Population Projections by Age and Sex, by Regions and Countries, 1965-85, Medium Variant.

The only exception, perhaps, is Japan where family ties are strong and aged parents live with their married children. As the quality of medical attention improves and preventive medicine is practiced vigorously, the proportion of old people in our societies will continue to increase. The society in its eagerness for a longer life has neglected the ever-growing number of old people. Table 14.1 shows the differences between the industrialised and the developing countries with regard to both life expectancy at birth and percentage of the population over 65. In many countries 65 is considered the beginning of old age perhaps because it is the age when people normally retire and as such it stands out as a social milestone.

It is true that living with children often creates its own problems, but it is sometimes the only answer. Old people require the shelter of a home more than ever. Some countries provide separate apartments linked to the home of one of the children with a view to provide the basic advantages of proximity. Some countries build special settlements with separate facilities but having common space for dining and cultural activities. Old age homes are also well known throughout the world but these should be restricted in size and run as homes in the real sense of the word and not as institutions.

TWO PICTURES OF WORLD'S LARGEST CITY

The world population reached nearly 3,800 million by the middle of 1972 and showed a growth rate of 2 per cent annually according to United Nations Demographic Year-Book issued recently. If the rate remains steady, the world population would double within the next 33 years to about 7,600 million by the year 2,007 A.D. The Year-Book also proclaims the Chinese city of Shanghai with the population of 10,820,000 as the world's largest city leaving behind Tokyo and New York with a population figures of 8,841,000 and 7,895,000 respectively. Let us have a look at this new champion in the municipal population and the premier industrial city of China. Tillman Durdin in "The New York Times Report from Red China" describes Shanghai as follows:

"In every direction as far as one can see factory chimneys pour out smoke that hangs in a murky smog reminiscent of that of New York or any other major American city. On the streets everyone seems a worker. In frumpy blue-clad millions, they overflow the sidewalks and almost choke the roadways. It is fortunate that there is little motor traffic, only the plying of motor and electric trolley buses, for there would not be space for both pedestrians and even a moderate number of private cars. What private transportation there is comes in the form of a ubiquitous bicycle, which is not yet motorized as it is in many other developing Asian nations. The

bicycles vie in formidable battalions with the press of pedestrians.”⁶ In a flash back of 40 years the same American newspaper correspondent reports: “In its heyday in the nineteen thirties Shanghai was a cosmopolitan metropolis of rushing traffic of bright lights, of innumerable places of pleasure of rampant vice and high intellectualism, of an enormously wealthy, high-living elite, of an emerging middle class and of millions of people toiling in poverty.”⁷

We have before us two impressions of the same city drawn with a time difference of four decades. They bring out in bold relief the fact that development of a city is strongly bound with political, economic and general factors at levels much higher than local administration. This in fact was one of the many important findings of the First Conference of Mayors of the World's major cities held in Milan on 16-18th April, 1972. Para 4 of the final resolution of the above meeting states: “The development of the city is strongly bound up with political, economic and general factors at higher levels than the local administration; the latter will thus not be able to adequately perform their own tasks unless they can find an organised point of connection between decision taking and execution of development planning.”⁸

Shanghai today is proletarian city, full of punch and vigour but with little of ebullience and sparkle of old. Our biggest handicap is that we have no set of comparable social indices to tell us whether the society as distinct from economy is important and if so to what extent.

WORKERS UNDER STRESS

The present day trend in the medical science points out that 30 per cent of all patients who go to the doctor are believed to be suffering from illnesses caused by stress. The stress it is said can result in all kinds of problems like digestive trouble, insomnia, nervous tension, irritability and even heart disease. It is proclaimed that it is essential for a man to get away from the office shutting himself mentally as well. Bearing these facts in mind, the Greater London Council it is learnt has decided that its 500 senior officials can qualify for a stress leave up to 3 months along with travelling expenses of about Rs. 5000. In its own way such measures can result in better quality of life both for those who govern the city as well as the citizens. The exposure of workers to multiple stresses also causes adverse effects on his health and calls for adequate safety measures.

⁶“The New York Times Report from Red China”, Avon Books, Feb., 1972.

⁷*Ibid.*

⁸“First conference of Mayors of the World's Major Cities held at Milan on 16-18th April, 1972, Final Resolution.”

AN EXAMPLE IN UNDEVELOPED PLANNING

Zaire, the South Central African nation formerly known as Congo has taken a lead in setting an example by leaving aside 15 per cent of its territory as natural reserve where vast tracts of land comprising of volcanoes, mountains, waterfalls, jungles, lakes, etc., will remain untouched by human beings. According to President Mobutu Sese Seko when scientists have transformed the rest of the world into an artificial environment he would like there to exist a last human refuge in Zaire. This undeveloped planning is a lesson to the less developed countries who in a shortsighted dash consider industrialisation more important than preservation of nature.

URBAN ARTS COMMISSION

Delhi now has an "Urban Arts Commission" with a view to preserving, developing and maintaining the aesthetic quality of urban and environmental design within Delhi. This has given rise to lot of thoughtful comment. Some feel that setting up of such a Commission would mean yet another hurdle which a citizen will have to cross. Others more artistic point out that although greatest industrial achievements do emerge from committees but certainly not the greatest painting, sculpture or other such pieces of art. They point out that "artists do not come in teams". The more seasoned, however, feel that artistic control over environment is always desirable and that even an artistically imperfect control will give better results than no control at all. Good architecture would become meaningless if surrounded by a framework which is not consistent with its conception. The majestic Red Fort would lose its royal stature if permitted to be surrounded by modern match-box structures.⁹

AESTHETIC DIMENSION AS THE FUTURE TEST

While talking to their electorates, politicians completing the term of office and seeking another almost invariably describe their deservedness in terms of making their constituency more prosperous than what it was when they began their term. The electorate is invariably swept away on a current of increased output. The aesthetic dimension according to John Galbraith introduces a new and much stronger test. "It means that mayors completing a term at city hall, governors at the State capital, Presidents in the White House, Prime Ministers at 10 Downing Street will be asked whether they have left their city, state or country more beautiful than before. This test will not be so easy. Few if any in this century would have passed. The fact of universal failure is another reason for not insisting on the importance of the aesthetic dimension. No one

⁹For a detailed discussion please see chapter on 'Law and Urban Land', in this book.

likes an examination which he surely flunks. But far more than the test of production, which is far too easy, the test of aesthetic achievement is the one that one day the progressive community will apply."

PARAMETERS FOR "QUALITY OF LIFE"

If we were to see per capita annual consumer expenditure in different sections of rural and urban population in India, the same has been going down for the bottom 20 per cent of urban population and in respect of rural population it is more or less static. If the extent of poverty was a barometer to measure quality of life, one would say it has gone down for this population. However statistics can be misleading. Mr. Kidar Nath Sahni, the then Mayor of Delhi, said: "Today we talk in terms of 'Gross National Products' or 'Per Capita Income' but we have no measures, no set of comparable 'social indices' to tell us whether society as distinct from economy is also healthy. In other words, we have no measures of 'quality of life'. We have no indices, no parameters to tell us whether our education system is effective, whether art, music and literature are catching up, whether civility and kindness are increasing and whether the city is becoming more livable from year to year."¹⁰

The relevance of various subjects discussed above lies in the fact that it is men who make a city. The city dwellers suffer from a certain type of loneliness and in spite of the fact that cities are quite crowded and well packed with human beings. Planning must take into consideration the emotional requirements of people concerned and the best planning of all is the one that takes into consideration the greatest margin of freedom.

URBAN ECOLOGY

Otis Dudley Duncan describes ecology as having four elements: population, organization, environment and technology. A fifth element equally important is social-psychological factor. Take the deluge in Madras that occurred during November, 1976 in which some buildings and numerous huts came tumbling down like a pack of cards. The entire Vyasarpadi development was allowed to be built on an abandoned tank. Thoughtless urbanization in utter disregard to elementary town planning principles can bring about such a catastrophe.

During the same year nearly 600,000 people were shifted from central areas of Delhi to resettlement colonies spread over an area of nearly one thousand hectares (2500 acres). These colonies, it is boasted, were developed in a record period of about six months with dry cleaning systems, hand pumps

¹⁰Kidar Nath Sahni in "The Lack of Homes in the City of Smiles", Second Conference of Mayors of the World's Major Cities, Milan, April 16-17, 1973.

and with rudimentary storm water drains which follow a zig zag route presumably adopted to permit the storm water to partly evaporate in atmosphere and partly seep through the soil. What the engineers did not see is that the entire area known as Khichripur and adjoining colonies forms a natural drainage basin of Rivers Yamuna and Hindon. The contours as indicated in the Survey of India maps bring it out as a shallow bowl, like a saucer on an average 10 feet below the Yamuna river bed. A completely untenable explanation is offered to the effect that this 1000 hectare bowl can be drained with the help of syphons under the Hindon cut into the adjoining state of Uttar Pradesh. Even, if one is to concede for the sake of argument that such a syphon would work, why should the state of Uttar Pradesh be ready to accept these flood waters? The entire arrangement has been declared "satisfactory" only because the roads (built above a certain flood level) remained dry during one monsoon. The surrounding grounds remain full of stagnant waters. Some of these are explained away as lakes and water reservoirs, even though these continue to act as breeding places for flies and mosquitoes. Any development has to foresee situations, which may occur after years and these situations have to be studied thoroughly before such large scale developments are taken in hand. It is not that this space was not known earlier, but planners had kept it in agricultural green-belt for valid reasons. The idea of revival of "Old Shikargah" was to be implemented through afforestation in this vast area thus maintaining an ecological balance. Apart from sociological and other reasons, this poor man's settlement will stand suffocated between the manufacturing industry in the North (Shahdara Industrial Area, the largest indicated in the capital's Master Plan) and yet another—the 1200 acres being planned by New Okhla Industrial Development Authority in the South. Whichever way the wind blows this area would be condemned with smoke pollution for all time to come. This to my mind, is an extreme case of ecological upset in which all the five factors namely : population, organization, environment, technology and socio-psychological factors easily and ironically recalled by the acronym P.O.E.T.S., have been seriously jeopardized.

In contrast, the situation created by the squatter settlements outside Khartoum in Sudan where thousands of nomads had been settled in concentric rings of shelters of varying specifications—farthest being in tents and nearest to the city in huts with mud walls and roofs, was planned and developed in a different manner. "When police set out to tear down the tents, urban planner Constantinos Doxiadis recommended that they not only *not* destroy them, but that certain municipal services be provided to their inhabitants. Instead of seeing these concentric rings in wholly negative terms, the late Doxiadis suggested, they might be viewed as a tremendous teaching machine through which individuals and families move, becoming urbanized step by step". The basic philosophy is that whenever a change in any form is contemplated, the possibility of gradualizing the change must be examined. The abrupt upheaval, whether social or technological, can leave deep emotional and physical

scars and the whole exercise becomes self-defeating. This principle holds good not only in case of resettling poor people but can find general application on a larger scale. "Abrupt, all-or-nothing, ego-crushing" retirements from service, release of criminals and mental patients from their confinements and their immediate induction into society, rural migrant's entry into the urban areas are some other examples where change can be controlled in graduated stages. The results would then be lasting as it could be another form of informal learning process.

The senseless destruction of natural landscape in our cities is yet another tragedy of high handedness of people with little application of the long range consequences and the beneficial effects of natural assets on cultivation of a healthy mind. The Marina in Madras or the Seafront around Bombay island or the Ridge in Delhi are nature's gift, an invaluable asset. Unfortunately, lot of vandalism has taken place which has denied these natural gifts for future generations. The denial of seashore in Bombay to common people because land profiteers have walled the view with tall buildings along the sea, likewise the beauty that river front of Hooghly could have provided in Calcutta are examples where no use was made of such natural assets which these cities once had. And here in Delhi, we went a step ahead and picked the pocket of nature, —that visible garment of God—by digging up a beautiful ridge some thirty five feet deep. What is worse, we did it in the name of God. (The site seems to have been allocated to a place of worship). Thousands of truck loads of rock and stone have been sold and hundreds of trees were mercilessly felled during a period when "five-point programme" was very much the charter for the authorities in Delhi. The tree plantation together with preservation of landscape were the best point but in actuality the implementation has erased part of the most beautiful landscape in Delhi.

The Ridge and the River front provided Delhi rather unique opportunities for its citizens to rest and relax. A landscape once destroyed can never be re-created. The visual squalor now adorning the Ridge, the C-Power Station, etc., and the establishment of a huge Defence Complex close to Tughlaqabad Fort have done irreparable damage to naturally inherited landscape and environment. Its loss is really incalculable.

Urban ecology is deeply concerned with inter-relationships among groups of men and types of institutions as they manifest themselves in a human settlement—a city, a town or a village. A human settlement is not a mere agglomeration of people or groups of people in space. It is more than that because it concerns with spatial distribution, the interlinkage of functions they perform, the dynamics of the social order and the cultural and economic factors which bring people together. Ultimately they reflect a life style, a culture. In city planning, nature has to be given not only sufficient time to make adjustments but that natural systems must be respected if mankind is to draw real benefits from them. If nature is wronged, a landscape is destroyed or basic ecology is upset, sooner or later all will suffer. In this sense the tragedy

in Madras or the destruction of Delhi's Ridge or the disruption brought to the drainage basin across Yamuna is not purely "an act of God". It is vandalism, pure and simple—an Act of Man.

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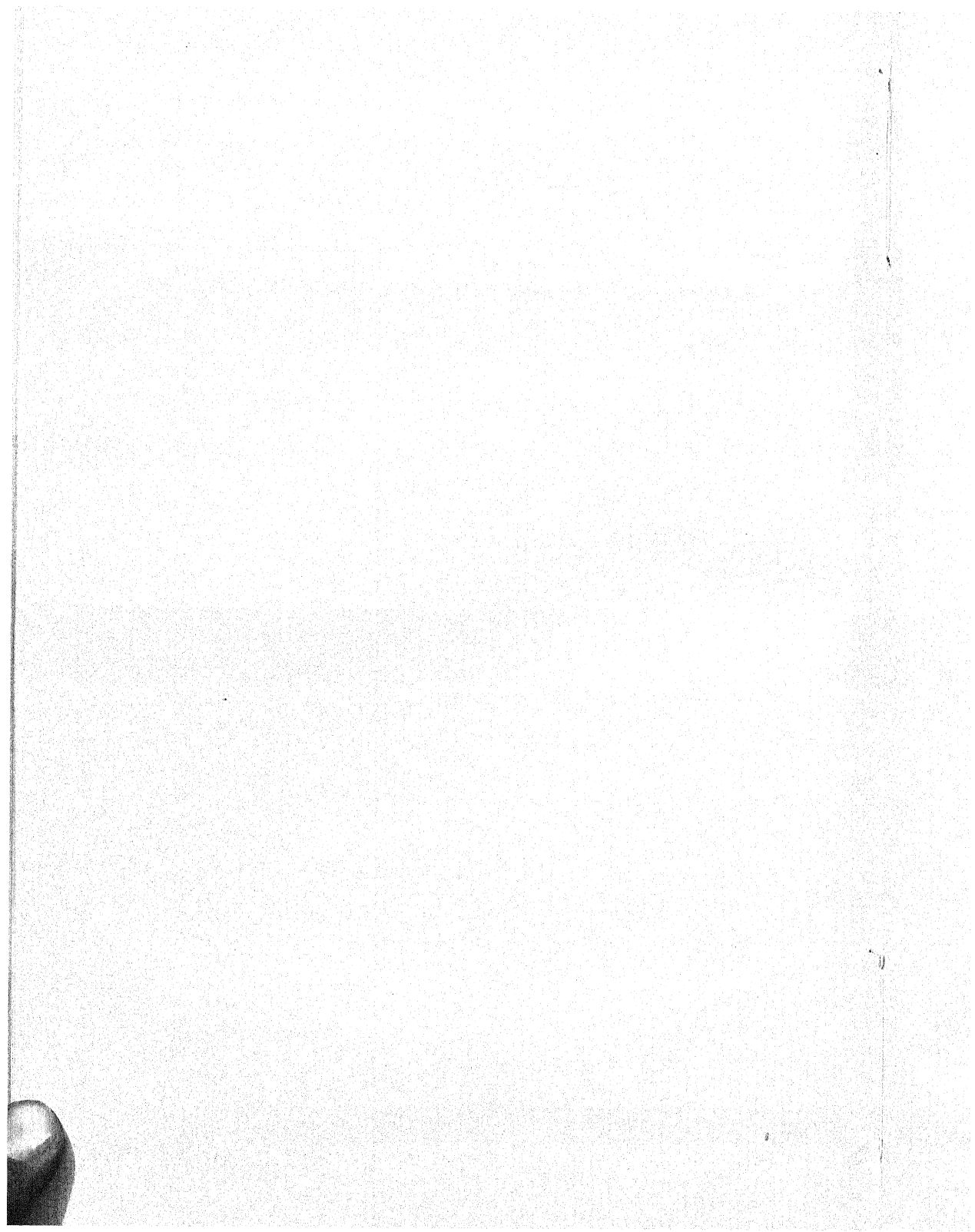
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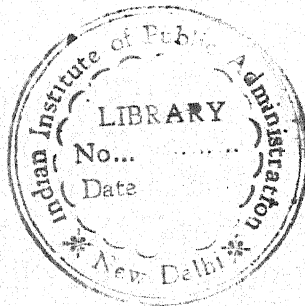
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